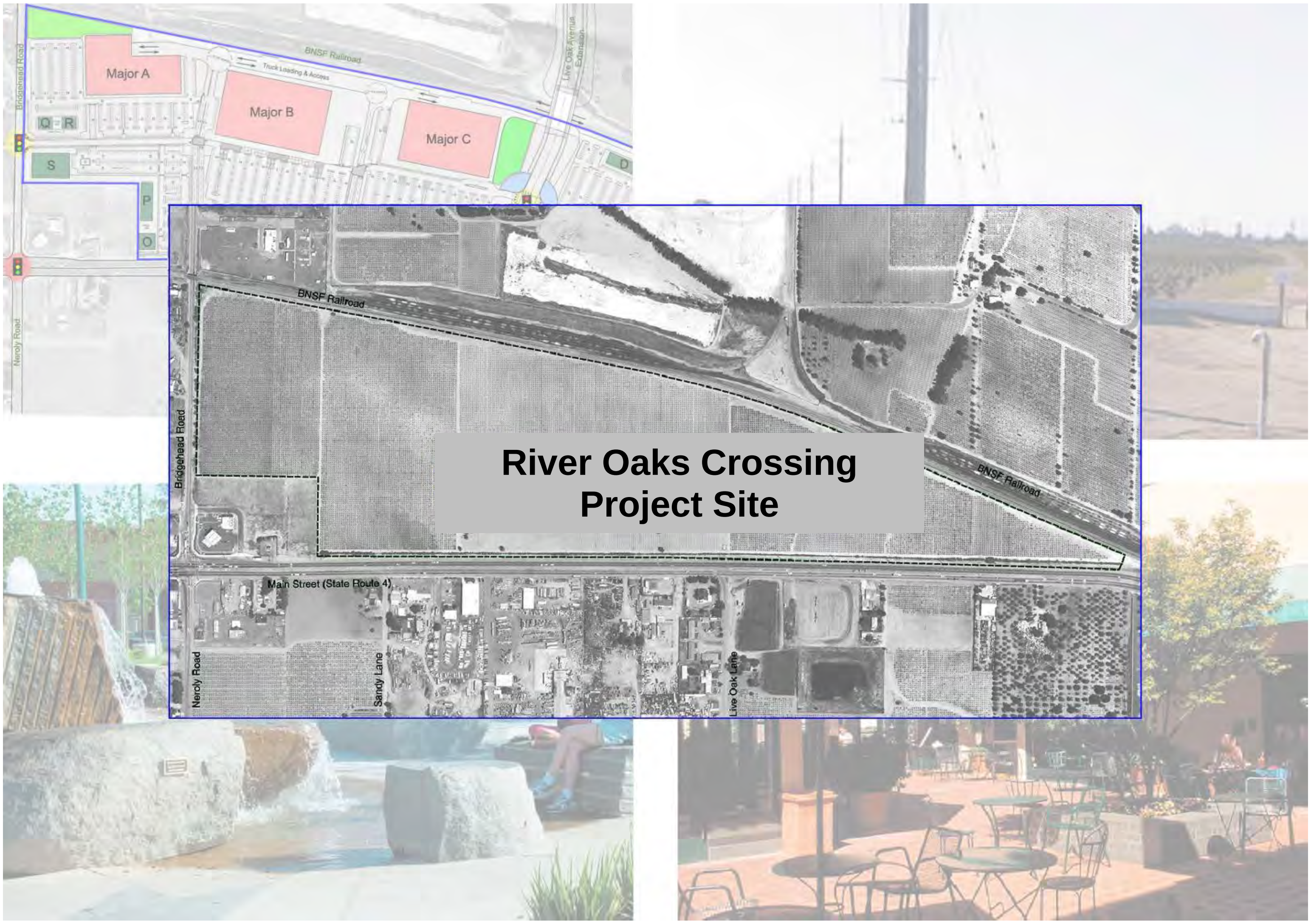
River Oaks Crossing Specific Plan
Draft EIR Technical Appendices

(Previously known as the Cline Specific Plan Draft EIR)
State Clearinghouse # 2003112042



September 2007

City of OAKLEY
A Place for Families in the Heart of the Delta

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Retail Market Impact Analysis

URS Greiner Woodward Clyde
DuPont Environmental Site Assessment

Kleinfelder, Inc.
Project Site Phase I and Limited Phase II Environmental Assessments

Lead Agency
City of Oakley
3231 Main Street
Oakley, California 94561

DEIR TECHNICAL APPENDICES

Appendix A

Notice of Preparation, Comments on Notice of Preparation, and Initial Study

CITY of OAKLEY
A PLACE for FAMILIES
in the HEART of the DELTA

NOTICE OF PREPARATION

To:		From:	City of Oakley – Community Development
			3639 Main Street
			Oakley, CA 94561
			Attn: Barry Hand, Director

Subject: **Notice of Preparation of a Draft Environmental Impact Report**

The City of Oakley Community Development Department will be the Lead Agency and will prepare an environmental impact report for the project identified below. We need to know the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency will need to use the EIR prepared by our agency when considering your permit or other approval for the project.

The project description, location, and the potential environmental effects are contained in the attached materials. A copy of the Initial Study (is ☒ is not ☐ attached).

Due to the time limits mandated by State Law, your response must be sent at the earliest possible date but not later than 30 days after receipt of this notice.

Please send your response to Barry Hand at the address shown above. We will need the name for a contact person in your agency.

Project Title:	Cline Property Specific Plan
Project Applicant, if any:	City of Oakley Redevelopment Agency

Date	October 31, 2003	Signature	
		Title	Community Development Director
		Telephone	(925) 625-7000

Reference: California Code of Regulations, Title 14, (CEQA Guidelines) Sections 15082(a), 15103, 15375.

ENVIRONMENTAL INITIAL STUDY

Cline Property Specific Plan
Oakley, California

October 31, 2003

Prepared for:

City of Oakley
Community Development Department
3639 Main Street
Oakley, CA 94561
(925) 625-7000

RICHARD T. LOEWKE, AICP
URBAN & ENVIRONMENTAL PLANNING

55 Oak Trail Ct.
Alamo, CA 94507
925.831.8016

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LIST OF FIGURES

1. SUMMARY

Project Title:	Cline Property Specific Plan, Oakley California.
Lead Agency Name & Address:	City of Oakley Community Development Dept., 3639 Main Street, Oakley CA 94561.
Contact Person & Phone Number:	Barry Hand, City of Oakley Community Development Director (925) 625-7000.
Project Location:	North side of Main Street between Bridgehead Road and Big Break Road, City of Oakley.
Project Sponsor's Name & Address:	City of Oakley Redevelopment Agency, 3639 Main Street, Oakley CA 94561 Attn: Ellen Bonneville, Director. Tel.: (925) 625-7000.
General Plan Designation:	Oakley 2020 General Plan: Commercial.
Zoning:	Current Zoning is: Heavy Industrial.

Description of Project:

The City of Oakley Redevelopment Agency is sponsoring the preparation of a specific plan to guide future development of the 71-acre Cline Property. The City adopted its first General Plan in 2002, based on a certified program level EIR. In accordance with the Oakley 2020 General Plan, the specific plan will address a range of possible commercial uses for this property. The specific plan will identify needed roadway and infrastructure improvements to serve the project site and surrounding area, and will propose a set of development standards and design guidelines for future buildings and site improvements. This Initial Study concludes that future development contemplated in the specific plan could have potentially significant pre-mitigation environmental effects with respect to the following:

- Aesthetics
- Agricultural Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Geology and Soils
- Hazardous Materials
- Hydrology and Water Quality
- Noise
- Public Services
- Transportation and Traffic
- Utilities and Service Systems

The nature and extent of potential environmental impacts are summarized in Section 3 of this Initial Study. An Environmental Impact Report will therefore be prepared to analyze these effects and explore various means by which to avoid or reduce project impacts.

2. PROJECT DESCRIPTION

A. Site Characteristics and Surrounding Uses

The Cline Property Specific Plan area is located in the northwesterly portion of the City of Oakley in Contra Costa County. The 71-acre site is situated on the north side of Main Street (State Route 4) between Bridgehead Road and Big Break Road, immediately east of State Route 160 (see vicinity and project area maps below).

Figure 1: Regional Vicinity Map

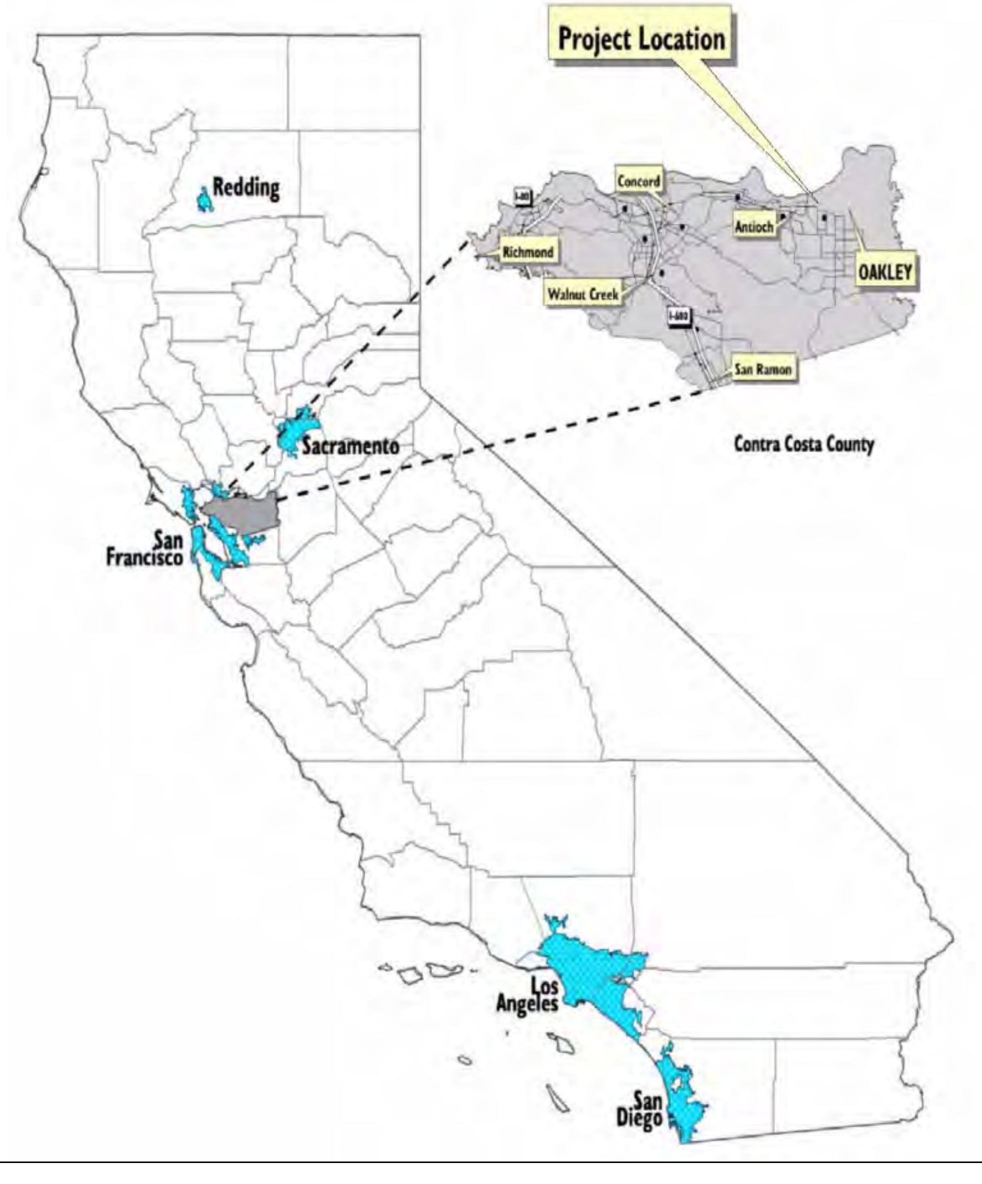
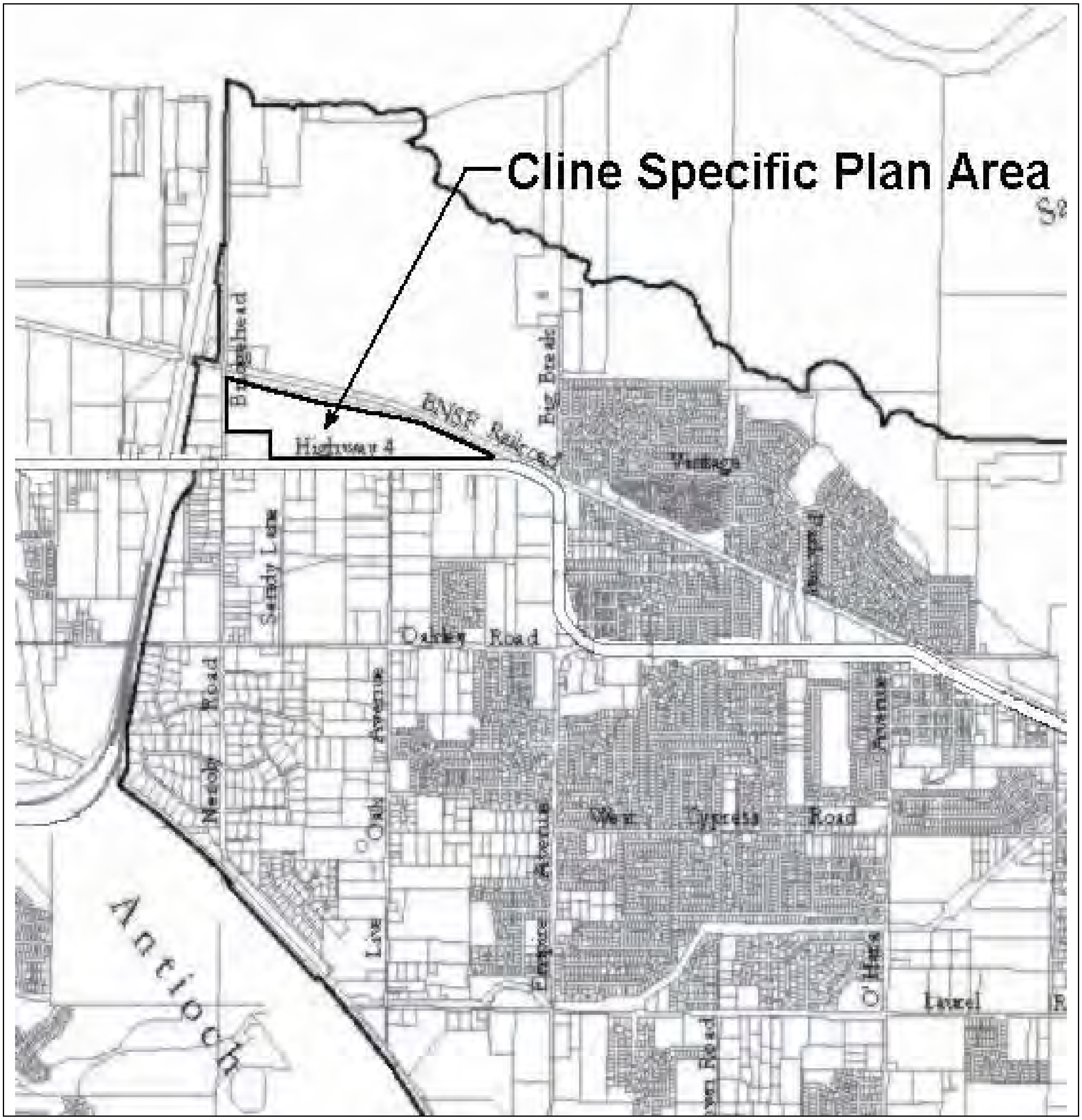


Figure 2: Project Area Location Map



This relatively flat site fronts on the north side of Main Street (current State Route 4), a four-lane arterial roadway which provides access through central Oakley to eastern Contra Costa County. The subject property also has frontage on the east side of Bridgehead Road, a two-lane local collector street.

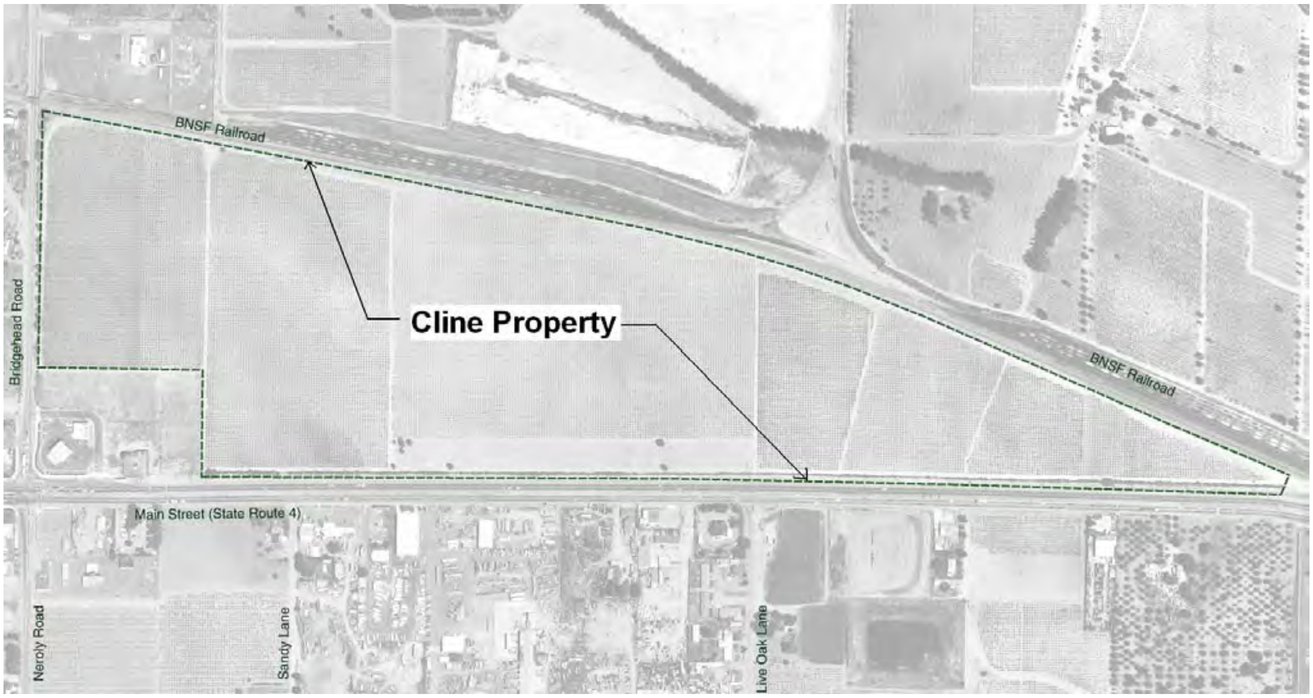
The site is bordered along its northerly property line by the BNSF Railroad line. North of the railroad line are vacant properties owned by the DuPont Chemical Company, along with additional privately owned properties cultivated with grapes. These adjacent properties are collectively zoned for heavy industrial use, and extend from Bridgehead road on the west to Big Break Road on the east. As shown in Figure 6 below, these properties are classified in the General Plan Land Use Element for Industrial, Business Park and Utility / Energy uses.

An existing single-family neighborhood is located further to the east, separated from Big Break Road by a masonry sound attenuation wall. Properties opposite the Cline Property, on the south side of Main Street, include a range of service and highway-oriented commercial uses, and remaining agricultural activities, all of which are classified in the General Plan for Commercial use.

A gasoline station and convenience food store occupy the northeast corner of Bridgehead Road and Main Street. Situated between this corner and the Cline Property is a 4.46-acre site for which the City has approved a minor subdivision application (MS 98-0016) to create four separate commercial parcels. Anticipated uses within the approved commercial subdivision include a restaurant, car wash, and motel. A drive-through coffee bar currently exists along the Main Street frontage of this adjoining site. These adjoining properties are also classified for Commercial use under the General Plan, as shown in Figure 6.

As shown from the aerial view in Figure 3 below, the Cline Property has a triangular shape, with increasing site depth moving from east (Big Break Road end) to west (Bridgehead Road end). No buildings exist on the site, which is cultivated with grapes.

Figure 3: Aerial View of Project Site and Vicinity



B. Description of Project

The specific plan will provide for a range of retail and service oriented uses on the 71-acre project site, consistent with the current General Plan classification of Commercial. The specific plan will identify needed roadway and infrastructure improvements to serve the project site and surrounding area, including accommodation of the planned extension of Live Oak Avenue from south of Main Street. Internal circulation planning will include a plan for vehicular access points on both Bridgehead Road and along the roughly two-thirds mile frontage of Main Street (State Route 4).

In addition, the plan will present a set of development standards and design guidelines for future buildings and site improvements. Future development within the specific plan area may take place is phases, depending on market absorption. A series of retail and service commercial buildings will be distributed over the site, with an anticipated gross floor area of up to 770,000 square feet (a floor area ratio of 0.25). Parking, landscape and related site improvements will be constructed in accordance with City standards to meet the needs of the future commercial tenants.

Implementation of the Cline Property Specific Plan project will require a number of approvals from local, State and Federal authorities. Following is a summary of proposed and anticipated project entitlements:

City of Oakley. Based on future development of commercial uses on the 71-acre site, the following actions and entitlements are anticipated from the City of Oakley and its Redevelopment Agency:

(1) Certification of a focused project Environmental Impact Report.

(2) Rezoning from current Heavy Industrial District to a Planned Unit Development District to provide for a set of permitted and conditional uses, to establish customized development standards in accordance with the specific plan, and to promote compatibility with adjoining uses.

(3) Development Plan approval for individual buildings on a phased basis.

(4) Tentative subdivision map approval to facilitate division of the 71-acre site into separate parcels and/or leasehold interests.

(5) Related City approvals, including encroachment permits, and construction permits.

Other Responsible Local, State and Federal Agencies. The following additional actions will be required in order to implement the Cline Property Specific Plan:

(6) Contra Costa County Flood Control and Water Conservation District (approval of storm drainage design and mitigation).

(7) Diablo Water District (permits to connect to current District facilities and facilitate treated water usage).

(8) Ironhouse Sanitary District (permits to connect to current District facilities for discharge of wastewater effluent).

(9) California Regional Water Quality Control Board (National Pollution Discharge Elimination System stormwater discharge permit approval).

(10) California Department of Transportation encroachment permits and related actions associated with anticipated frontage improvements.

Figure 4: View of Site Looking West along Main Street

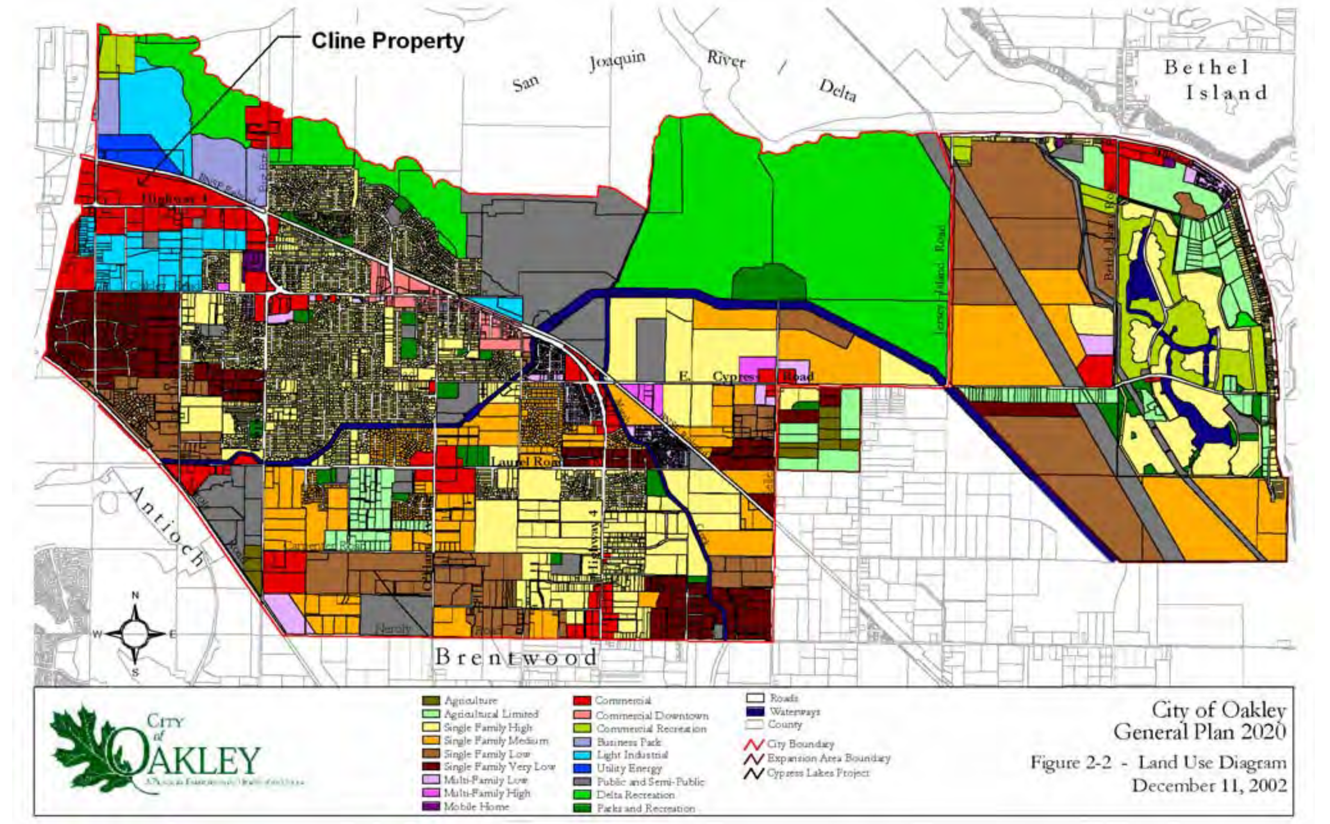
Figure 5: View of Site Looking East from Bridgehead Road

C. Relationship to Oakley General Plan

The City of Oakley adopted its first comprehensive General Plan in December of 2002. The new General Plan covers the time horizon of 2002 through 2020. This action was supported by advance preparation and certification of a comprehensive program-level EIR (SCH No. 2002042134). Both the General Plan and supporting environmental analysis anticipated development of the subject 71-acre site with commercial land uses. The current Heavy Industrial Zoning will be amended as part of the specific plan process to a compatible Planned Unit Development zoning.

Many of the environmental issues examined in this Initial Study were contemplated in the Oakley 2020 General Plan environmental impact report. In particular, impacts stemming from conversion of agricultural land uses, incremental increases in air emissions, increased traffic flow, associated noise, and resulting increases in demand on public services and infrastructure were all addressed as part of the previous study at a level which incorporated anticipated commercial development of the subject property. The analysis in Section 3.D. of this report builds upon this information.

Figure 6: Oakley General Plan Land Use Diagram



3. INITIAL STUDY CHECKLIST

A. Environmental Factors Potentially Affected:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a “Potentially Significant Impact” as indicated by the checklist on the following pages.

☑ Aesthetics
☑ Biological Resources
☑ Hazards & Hazardous Materials
☐ Mineral resources
☑ Public Services
☑ Utilities / Service Systems
☐ Agricultural Resources
☑ Cultural resources
☑ Hydrology / Water Quality
☑ Noise
☐ Recreation
☐ Mandatory Findings of Significance
☑ Air Quality
☑ Geology / Soils
☐ Land Use / Planning
☐ Population Housing
☑ Transportation / Traffic

B. Determination:

On the basis of this initial evaluation:

I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.	☐
I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.	☐
I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.	☐

I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.	✓
I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.	

The foregoing determination is based on the analysis contained in the following section of this Initial Study.

Barry Hand
City of Oakley
Community Development Director
3639 Main Street
Oakley, CA 94561
(925) 625-7000

Date

Initial Study Prepared by:

Richard T. Loewke, AICP
55 Oak Trail Court
Alamo, CA 94507
(925) 831-8016

C. Sources

In the process of preparing the Checklist and conducting the evaluation, the following references were consulted:

A. Abrams Associates, March 2000. Traffic Impact Analysis for Lodge Property on State Route 4.
B. City of Oakley, December 2002. *Oakley 2020 General Plan.*

C. City of Oakley, December 2002. *Oakley General Plan 2020 Final Environmental Impact Report.*
D. City of Oakley, April 2003. *Draft Capital Improvement Program for the City of Oakley.*
E. City of Oakley, September 2001. *General Plan Background Report.*
F. East Bay Regional Park District, October 2001. *Big Break Regional Shoreline Land Use Plan.*
G. East Bay Regional Park District, August 2001. *Initial Study and Proposed Mitigated Negative Declaration for Big Break Regional Shoreline Land Use Plan.*

D. Evaluation of Environmental Impacts:

<table>
<tr><th>Issue</th><th>Information Sources (See Item 3.C Above)</th><th>Potentially Significant Impact</th><th>Less than Significant With Mitigation</th><th>Less Than Significant Impact</th><th>No Impact</th></tr>
<tr><td colspan="6">1. Aesthetics – Would the project:</td></tr>
<tr><td>a) Have a substantial adverse effect on a scenic vista?</td><td>B, C</td><td></td><td></td><td>✓</td><td></td></tr>
<tr><td colspan="6">Discussion: As further explained under the Project Description section, the Cline Property is located on the north side of Main Street adjoining the BNSF Railroad line and DuPont Chemical site. The proposed commercial buildings will not block or otherwise interfere with any scenic vistas, as identified in the Oakley 2020 General Plan.</td></tr>
</table>

<table>
<tr><td>b) Substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a State scenic highway?</td><td>B,C, E</td><td></td><td></td><td>✓</td><td></td></tr>
<tr><td colspan="6">Discussion: The proposed project is located within a rapidly urbanizing area of northwest Oakley. No heritage trees, rock outcroppings or known historic buildings are located within the vicinity of this project. Main Street is a major arterial roadway and currently serves as State Route 4 through Oakley. Development of the subject site would not block any public views of Mt. Diablo or other designated scenic resources, as identified in the General Plan.</td></tr>
<tr><td>c) Substantially degrade the existing visual character or quality of the site and its surroundings?</td><td>B, C, E</td><td></td><td>✓</td><td></td><td></td></tr>
<tr><td colspan="6">Discussion:
The proposed specific plan is expected to authorize construction of up to 770,000 square feet of commercial buildings on a 71-acre site which stretches over two-thirds of a mile along Main Street (State Route 4) at the westerly entrance to the City of Oakley. Although individually subject to design review approval, the multiple commercial structures could present a range of divergent architectural styles and utilize contrasting development standards, unless properly coordinated through the specific plan process. Although individually insignificant, this collective mass of buildings could have a significant effect on the quality of the visual environment at the City's westerly entrance. The specific plan is intended to address this issue through development of design guidelines and development standards applicable to the entire site.</td></tr>
<tr><td>d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?</td><td>B, C, E</td><td></td><td>✓</td><td></td><td></td></tr>
<tr><td colspan="6">Discussion: Parking lot lighting is anticipated as part of future commercial development on the 71-acre site. Consistent with City standards, the specific plan will need to address the location and design of exterior lighting in such a manner as to control glare and avoid impact to motorists on Main Street and Bridgehead Road. The impact from future development along this segment of Main Street could be significant, unless controlled through the specific plan process.</td></tr>
</table>

Issue	Information Sources (See Item 3.C Above)	Potentially Significant Impact	Less than Significant With Mitigation	Less Than Significant Impact	No Impact
2. Agricultural Resources: In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project:					
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	**B, C, E**			✓	
Discussion: The subject property is composed of Class II Delphi sand, described by the U.S. Natural Resources Conservation Service as “excessively drained soils” where runoff is slow or very slow. Used as a vineyard, the 71-acre is increasingly constrained for continued viable agricultural use because of encroaching commercial and industrial development (see Section II for a more complete description of surrounding land uses). This site is not designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency. Based on these factors and the threshold analysis provided in the City’s General Plan EIR, conversion of the vineyard to urban uses in accordance with the adopted Commercial land use classification would not represent a significant impact.					
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	**B, C, E**				✓
Discussion: No Williamson Act contracts apply to the subject property. No other properties in the vicinity of this site are currently under Williamson Act contract.					
c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use?	**B, C, E**				✓
Discussion: The proposed project is situated adjoining a major arterial street in a rapidly developing portion of Oakley. It has been designated for commercial development according to the City’s General Plan, and is surrounded by other commercial or industrial zoned lands. No additional direct or indirect impacts to agricultural interests will result from development of the project as proposed.					

<table>
<tr><th>Issue</th><th>Information Sources (See Item 3.C Above)</th><th>Potentially Significant Impact</th><th>Less than Significant With Mitigation</th><th>Less Than Significant Impact</th><th>No Impact</th></tr>
<tr><td colspan="6">3. Air Quality: Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:</td></tr>
<tr><td>a) Conflict with or obstruct implementation of the applicable air quality plan?</td><td>B, C, E</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td colspan="6">Discussion: The proposed project will contribute incrementally to local and regional air quality impacts, both in terms of construction-related activities and emissions from additional vehicle trips associated with the commercial use. These impacts have been identified as part of the cumulative analysis contained in Chapter 3.4 of the Oakley 2020 General Plan EIR. This program level analysis identifies increased long-term emissions of ROG, NO_X, CO and PM_{10}, as well as dust and other airborne contaminants during construction. Mitigation measures recommended as part of the General Plan program must be applied in order to reduce potential impacts to a less than significant level. The project must participate in or otherwise be in compliance with each of these measures.</td></tr>
<tr><td>b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?</td><td>B, C, E</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td colspan="6">Discussion: The Cline Property Specific Plan project will contribute incrementally to air quality impacts associated with additional traffic movements. These impacts must be quantified based on the range of proposed land uses in the Plan, and appropriate mitigation measures must be developed in accordance with threshold standards identified in the General Plan EIR. A detailed project traffic analysis must be developed to identify potential intersection level of service impacts and any resultant significant increases in traffic delays.</td></tr>
<tr><td>c) Result in a cumulative considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?</td><td>B, C, E</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td colspan="6">Discussion: The proposed commercial project will contribute to cumulative traffic and air quality impacts as discussed above. According to the analysis contained in the Oakley General Plan EIR, development within the City of Oakley will adversely impact the Bay Area air basin, which is currently classified under the federal Clean Air Act as a “nonattainment area” for ozone. Local development will also impact Contra Costa County, which has been classified under the California Clean Air Act as a “nonattainment area” for ozone and PM_{10}. Based on the scale of development identified for the subject property, impacts associated with implementation of the proposed specific plan will be equal to or less than those identified as part of the cumulative analysis presented in the General Plan EIR. Additional analysis and mitigation measures are warranted, however, in order to assure that project impacts do not exceed identified threshold levels identified in the General Plan.</td></tr>
<tr><td>d) Expose sensitive receptors to substantial pollutant concentrations?</td><td>B, C, E</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td colspan="6">Discussion: Grading operations associated with this project are small in scale, due to the relatively flat topography on site. It is, however, possible that residents of the neighborhood east of Big Break Road could be exposed to localized concentrations of dust pollutants associated with site construction. Mitigation measures will therefore need to be developed through the specific plan process to control grading operations, and as required by City Ordinance, to reduce these potential short-term impacts to a less than significant level.</td></tr>
</table>

e) Create objectionable odors affecting a substantial number of people?	**B, C, E**	✓			

Discussion: Although unlikely, it is possible that residents of the neighborhood east of Big Break Road could be exposed on a short-term basis to localized construction-related odors. Limitations on hours of construction will help to limit exposure of people during sensitive periods. Additional project-specific mitigation measures will be required as part of the specific plan program in order to reduce potential short-term impacts from construction activities to a less than significant level.

Issue	**Information Sources (See Item 3.C Above)**	**Potentially Significant Impact**	**Less than Significant With Mitigation**	**Less Than Significant Impact**	**No Impact**
4. Biological Resources: Would the project:					
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	**B, C, E**	✓			

Discussion: The subject 71-acre site is bounded on all sides by arterial and collector roadways and an active railway line. As detailed in Section II, commercial and industrial developments adjoin the site to the north, west and south, and an established residential neighborhood lies to the east of the site. Devoid of any native vegetation, and surrounded by urban infrastructure and uses, development of this site will not result in a loss of important biological habitat. A biological assessment prepared in September of 2003 for this property indicates that no special-status plants are therefore likely to occur on this site, and only a moderate potential exists for occurrence of one special status bird species (the burrowing owl). The burrowing owl, though not observed on or adjoining this site, is believed to have a moderate potential for occurrence, due to proximity to known habitat and cleared vegetation conditions. The City's General Plan analysis and other more recent site assessments within the area document the known history of burrowing owl occurrences within the vicinity of the project site, and provide recommendations for mitigation measures to protect against accidental take of the owl during the breeding/nesting season. The specific plan program will need to incorporate specific mitigation measures to avoid impacts to the burrowing owl.

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	**B, C, E**			✓	

Discussion: As noted in the preceding section, this site is currently cultivated as a vineyard, with disking occurring regularly between rows of vines. No riparian habitat or other sensitive natural community is present on the site, according to a reconnaissance-level site survey conducted in September of 2003. The site is isolated from such sensitive or natural communities by major roadways and commercial or industrial development.

c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	**B, C, E**				✓
Discussion: As indicated in Sections 4.a and 4.b above, the subject site contains no evidence of federally protected wetlands or waters of the U.S. Development of the site as proposed will not have an impact on any wetland habitats.					
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species, or with established native resident or migratory wildlife corridors, or impede the use of native nursery sites?	**B, C, E**			✓	
Discussion: No impacts are likely to result from implementation of the proposed commercial development (with the possible exception of one bird species discussed in 4.a above), as the subject site is isolated from any wildlife corridors or larger parcels capable of supporting migratory animals. No native vegetation is present on the site.					
e) Conflict with local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	**B, C, E**			✓	
Discussion: No heritage trees or other important natural vegetation would be affected by the proposed project. As is visible in Figures 3, 4 and 5, the loss on up to 5 trees could result from implementation of the proposed specific plan.					
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	**B, C, E**				✓
Discussion: No such plan applies to properties within the project vicinity. No conflicts would result with contemplated plans within the regional setting.					

Issue	**Information Sources (See Item 3.C Above)**	**Potentially Significant Impact**	**Less than Significant With Mitigation**	**Less Than Significant Impact**	**No Impact**
5. Cultural Resources: Would the project:					
a) Cause a substantial adverse change in the significance of a historical resource as defined in § 15064.5?	**B, C, E**	✓			
Discussion: The subject property is well removed from any sites known to contain cultural or historic resources. However, an archaeological and cultural resources assessment must be prepared for the subject property in order to determine the potential for impact to historic or cultural resources, and to guide the implementation of necessary mitigation measures, if any.					

b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?	**B, C, E**	✓			

Discussion: The EIR-level analysis completed for the 2001 General Plan Update has presented no documentation suggestive of cultural or archaeological resources in the vicinity of this property. A site-specific archaeological and cultural resources assessment is necessary, however, in order to determine the potential for subsurface artifacts or cultural remains, and to develop appropriate mitigation measures based on the conclusions of the analysis.

c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	**B, C, E**	✓			

Discussion: No. Refer to discussion under items 5.a and 5.b above.

d) Disturb any human remains, including those interred outside of formal cemeteries?	**B, C, E**	✓			

Discussion: The potential for discovery of human remains is very low, according to the archaeological and cultural resources analysis presented in the Oakley 2020 General Plan EIR. However, as noted above, a site-specific analysis is warranted to document conditions on this rather large site.

Issue	**Information Sources (See Item 3.C Above)**	**Potentially Significant Impact**	**Less than Significant With Mitigation**	**Less Than Significant Impact**	**No Impact**
6. Geology and soils: Would the project:					
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving?					
i) Rupture of a known earthquake fault, as defined on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Div. of Mines & Geology Special Pub. 42.	**B, C, E**	✓			

Discussion: A geotechnical analysis of the Oakley Planning Area is presented in the 2020 General Plan EIR and General Plan Background Report. In addition, detailed soils studies were previously prepared for the surrounding properties. Together, these studies confirm the absence of any earthquake faults as occurring within or adjoining the project site, and show that the site itself not located within a State mandated Earthquake Fault Hazard Zone. According to these reports, several active faults within the region, including the Antioch-Davis Fault (approximately 2 miles to the west), the Brentwood-Sherman Island Fault (approximately 5 miles to the south), the Great Valley Fault (approximately 5 miles to the east), and the San Andreas Fault (45 miles to the southwest) all have a potential to induce strong ground shaking. The General Plan EIR indicates a low potential for ground rupture on the subject property. However, earthquake activity can have a significant effect on the overall stability of the developed site. Mitigation measures must therefore be developed to provide recommendations for building and foundation design, as mandated by City Grading Ordinance and Building Codes to protect against the maximum probable earthquake and ground acceleration events.

ii) Strong seismic ground shaking?	**B, C, E**	✓			
Discussion: The Cline Property is potentially subject to earthquake-induced ground shaking, lurching, liquefaction, and lateral spreading, as discussed above. Mitigation measures will be required to address this otherwise potentially significant impact to people and improvements.					
iii) Seismic-related ground failure, including liquefaction?	**B, C, E**	✓			
Discussion: Seismically-induced ground failure and liquefaction are potentially significant impacts to future improvements within the project, unless mitigation measures recommended in a project soils report are fully implemented.					
iv) Landslides?	**B, C, E**			✓	
Discussion: This relatively flat project site presents little risk of potential landslides. Proposed project grading operations would not result in any large or steep cut or fill conditions.					
b) Result in substantial soil erosion or loss of topsoil?	**B, C, E**	✓			
Discussion: Grading work associated with development of this relatively flat site will involve minimal cut and fill operations. The site has no obvious topographical features, and presents no indication of risk associated with erosion. Nevertheless, mitigation measures will need to be developed to assure that grading activities are carried out in accordance with City standards. In addition, the provision of a Storm Water Pollution Prevention Plan (SWPPP) must be addressed, which will be reviewed and approved by the City and Flood Control District.					
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	**B, C, E**	✓			
Discussion: Information presented in City's General Plan EIR includes a general review of surface and subsurface conditions and soil characteristics. Detailed information compiled as part of soils studies on adjoining properties suggest that while this site is subject to earth movement resulting from earthquakes, no evidence of high potential for lateral spreading, subsidence, liquefaction or other soil-related safety issues is present. The specific plan will, however, need to address building design standards, including the preparation of a detailed soils report, in order to assure that engineering design has accounted for all soil surface and subsurface conditions.					

d) Be located on expansive soil, as defined in Table 18-1-B of the UBC (1994), creating substantial risks to life or property?	**B, C, E**	✓			

Discussion: Information contained in the EIR analysis prepared for the General Plan indicates that properties in this area may be subject to high shrink-swell conditions. Development of the subject property will be subject to compliance with applicable building codes and City grading ordinance requirements. Additional mitigation measures will need to be developed as part of the specific plan process to reduce the potential for slope failure or damage from soil shrinkage or expansion.

e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	**B, C, E**				✓

Discussion: Project does not involve demand for septic tank facilities; public sewer is currently available to serve the proposed project.

Issue	Information Sources (See Item 3.C Above)	Potentially Significant Impact	Less than Significant With Mitigation	Less Than Significant Impact	No Impact
7. Hazards and Hazardous Materials: Would the project:					
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	**B, C, E**			✓	

Discussion: No transport, storage or disposal of hazardous materials is associated with the anticipated future commercial development on the Cline property. No other hazardous materials will be used in sufficient quantities or under circumstances which could result in a potential hazard to the public or the environment. All construction work shall be in compliance with City ordinances, which will address construction-related hazards, materials usage and disposal.

b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	**B, C, E**	✓			

Discussion: Preliminary information indicates that a major gas pipeline crosses through the westerly end of the site. The location of existing pipelines or other underground utilities should be accurately identified through the specific plan process. Potential hazardous associated with such facilities as part of planned development on the site will be determined through the specific plan process.

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	**B, C, E**				✓

Discussion: See Item 7.a above. No existing or proposed schools are located within ¼ mile of the project site. The project is located within the service area of the Antioch Unified School District. See Sec. 13.c for additional information about nearby school facilities.

d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code §65962.5 and, as a result, would it create a significant hazard to the public or the environment?	**B, C, E**			✓	
Discussion: The project site is not located on a known or listed hazardous materials site, according to information compiled as part of the Oakley 2020 General Plan EIR analysis.					
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	**B, C, E**				✓
Discussion: No public airport is located within 2 miles of the project site; no impacts will result.					
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	**B, C, E**				✓
Discussion: No private airport is located within the vicinity of the project site; no impacts will result.					
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	**B, C, E**				✓
Discussion: The proposed project is located at the intersection of two public streets. Development as proposed will include planning for internal site circulation, as well as the accommodation of an extension of Live Oak Avenue from the south, thereby improving access to adjoining properties to the north. The project will therefore improve potentially needed emergency access.					
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	**B, C, E**			✓	
Discussion: Equipment used on site shall be properly licensed and maintained in accordance with City ordinances. The project site is located adjacent to public streets with adequate access for fire protection.					

Issue	Information Sources (See Item 3.C Above)	Potentially Significant Impact	Less than Significant With Mitigation	Less Than Significant Impact	No Impact
8. Hydrology and Water Quality: Would the project:					
a) Violate and water quality standards or waste requirements?	**B, C, E**	✓			
Discussion: The project must comply with all applicable Regional Water Quality Control Board standards and EPA regulations. The specific plan program will need to provide specific mitigation measures to assure compliance and avoidance of impacts. All project grading activities shall comply with the requirements of the National Pollution Discharge Elimination System (NPDES) Program, as established by the Clean Water Act. A Storm Water Pollution Prevention Plan (SWPPP) shall be prepared to provide for reduction of impacts from each phase of the project, consistent with NPDES standards.					
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	**B, C, E**	✓			
Discussion: Project must comply with all applicable Regional Water Quality Control Board standards and EPA regulations. No ground water recharge or ground water supply impacts are expected to directly result from development of the project site. Mitigation measures will need to be developed to reduce risks from grading activities to degrade downstream water quality, as part of the site grading and NPDES permit process.					
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	**B, C, E**	✓			
Discussion: The proposed 71-acre site will generate incremental increases in impervious surfaces and peak storm water run-off. The capacity of existing facilities to accommodate these flows must be verified. The project will also be responsible to pay its fair share of mitigation fees.					
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	**B, C, E**	✓			
Discussion: The proposed project will not change the pattern of drainage within this area. The rate of surface runoff in the post development condition must be further analyzed as part of the specific plan process; the adequacy of storm drainage facilities to accommodate such flows must be determined, and appropriate mitigation measures devised, as necessary.					

e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted water?	**B, C, E**	✓			
Discussion: Development authorized as a result of the specific plan will contribute to storm water runoff from the site. The specific plan must provide for facilities to collect and convey this water in accordance with City and CCFCWCD standards. Development of this project may include in lieu fees to assure adequate downstream capacity as outlined in the preceding sections.					
f) Otherwise substantially degrade water quality?	**B, C, E**	✓			
Discussion: The potential to adversely affect water quality exists given the scale of anticipated development on this site. The specific plan program will need to address these impacts in greater detail and provide mitigation to through compliance with all local ordinances and NPDES / RWQCB requirements, as discussed under item 8.a above.					
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	**B, C, E**				✓
Discussion: No new housing would be constructed as a result of the proposed project.					
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	**B, C, E**			✓	
Discussion: The project site is located immediately to the northeast of existing Main Street and Bridgehead Road. Figure 8-3 of the Oakley General Plan shows that properties in this vicinity are not within a potential 100-year flood plain. No impediments to storm water conveyances would result from this project.					
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	**B, C, E**			✓	
Discussion: No direct impacts will be caused by the proposed project, which is not located within any identified 100-year flood plain shown on the Oakley General Plan. The project will contribute to increased storm water flows, as discussed under item 8.e) above, however. The capacity of downstream facilities must be verified as adequate to accommodate anticipated flows.					
j) Inundation by seiche, tsunami, or mudflow?	**B, C, E**				✓
Discussion: The project site is protected from potential effects of seiche, tsunami. No landslides or slope instability impacts are expected as a result of this project, as discussed in Section 3.D.6 above.					

Issue	Information Sources (See Item 3.C Above)	Potentially Significant Impact	Less than Significant With Mitigation	Less Than Significant Impact	No Impact
9. Land Use and Planning: Would the project:					
a) Physically divide an established community?	**B, C, E**				✓
Discussion: The proposed project will be consistent with the recently adopted City of Oakley 2020 General Plan. As a part of the specific plan process, the property will be rezoned to a Planned Unit Development District to achieve consistency with the General Plan.					
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	**B, C, E**			✓	
Discussion: The 71-acre specific plan project will lead to entitlement of up to 770,000 square feet of new commercial development. Parking facilities will be provided to support the anticipated uses in accordance with City ordinances. This site is currently zoned Heavy Industrial; as noted under item 9. a) above, a rezoning will be carried out as part of the specific plan in compliance with current General Plan policy. The specific plan will provide for coordination of development on the site through a set of tailored development standards and design guidelines, in a manner consistent with all applicable General Plan policies.					
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	**B, C, E**				✓
Discussion: No Habitat Conservation Plan (HCP) or Natural Community Conservation Plan (NCCP) has been finalized for this region, although one may be developed in the future. The proposed project would not conflict with any prospective HCP or NCCP within eastern Contra Costa County.					

Issue	Information Sources (See Item 3.C Above)	Potentially Significant Impact	Less than Significant With Mitigation	Less Than Significant Impact	No Impact
10. Mineral Resources: Would the project:					
a) Result in a loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	**B, C, E**				✓
Discussion: According to the Oakley General Plan EIR, no mineral resource would be affected by the proposed development of the proposed project.					
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	**B, C, E**				✓
Discussion: Site is not used or planned for mineral resource recovery purposes. No mineral resource would be affected by this project.					

Issue	Information Sources (See Item 3.C Above)	Potentially Significant Impact	Less than Significant With Mitigation	Less Than Significant Impact	No Impact
11. Noise: Would the project:					
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	**A-G**	✓			
Discussion: A noise study was prepared as part of the Oakley 2020 General Plan EIR. The proposed commercial project would accommodate commercial tenants, occupying up to 770,000 square feet of building space on the site. Residential uses located east of the project (on the east side of Big Break Road), however, are sensitive to late evening noise and daytime noise associated with increased vehicular traffic. Temporary construction noise levels may also affect these residents. The specific plan program shall prepare a noise study to determine the magnitude and duration of such impacts. Mitigation measures developed as part of this program shall comply with the threshold limitations as set in the General Plan and City Noise Ordinance.					
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	**A-G**	✓			
Discussion: The project has the potential to generate construction related noise and vibration in excess of state/local standards. As noted under item 11a above, temporary construction noise and vibration will be addressed through the specific plan program, and may be addressed through specific mitigation measures.					
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	**A-G**	✓			
Discussion: Potential long-term impacts include increases in vehicular traffic and operational noise associated with truck deliveries. The nearest sensitive receptors are located east of Big Break Road, and separated by an existing sound attenuation wall. Potential impacts to these residents will be further evaluated as part of the specific plan program.					
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	**A-G**	✓			
Discussion: See comment under items 11a and 11b above.					
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	**A-G**				✓
Discussion: No applicable airport impacts.					
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working on the project area to excessive noise levels?	**A-G**				✓
Discussion: No applicable private airstrip impacts.					

Issue	Information Sources (See Item 3.C Above)	Potentially Significant Impact	Less than Significant With Mitigation	Less Than Significant Impact	No Impact
12. Population and Housing: Would the project:					
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	**B, C, E**			✓	
Discussion: Implementation of the specific plan program will not affect housing production or supply within the community. All infrastructure systems proposed to serve the project are sized and located in accordance with the General Plan, and would be completed with or without this project.					
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	**B, C, E**				✓
Discussion: No displacement of housing will occur as a result of the proposed project.					
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	**B, C, E**				✓
Discussion: No displacement of people will occur as a result of the proposed project.					

Issue	Information Sources (See Item 3.C Above)	Potentially Significant Impact	Less than Significant With Mitigation	Less Than Significant Impact	No Impact
13. Public Services: Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which would cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the following public services:					
a) Fire Protection?	**A-G**	✓			
Discussion: This project involves the construction of up to 770,000 square feet of future commercial floor space on a 71-acre site specifically entitled for such uses. Development of this project will create additional demand on fire protection facilities and services. Emergency response services to this project will be provided by the East Contra Costa Fire Protection District. The District maintains a station on Second Street in the downtown area, east of the site. A more detailed analysis of response times, the adequacy of existing facilities, and service demands must be provided as part of the specific plan program to determine impacts associated with future development on the site. Plans for this project must be reviewed and approved in accordance with inter-district agreements by the Contra Costa Fire Protection District. The proposed building layout must ensure that fire engines can adequately be positioned, in order to provide access to within 150 feet of the perimeter of all buildings, in accordance with California Fire Code requirements. Further mitigation for fire protection shall be provided as part of the specific plan program, in accordance with NFPA 13 requirements, which include full fire sprinklering of the buildings.					
b) Police Protection?	**A-G**	✓			
Discussion: Public safety impacts from the project must be evaluated and addressed as part of the specific plan program, pursuant to standards outlined in the General Plan.					
c) Schools?	**A-G**			✓	
Discussion: The project is located within the service area of the Antioch Unified School District, which operates facilities to the west within the City of Antioch, as summarized in Section 4.0 of the Oakley General Plan Growth Management Element. No significant impacts to any of these facilities will result from development of commercial uses under the specific plan.					
d) Parks?	**A-G**	✓			
Discussion: The City of Oakley maintains a system of neighborhood and community parks, based on a standard in the General Plan calling for 5 acres of public parkland per 1,000 residents. These facilities also serve employees of businesses in the City. A potential park is located approximately ¼ mile south of the subject property, as identified in Figure 7.2 of the General Plan. The potential impact of proposed business uses on this facility must be addressed as part of the specific plan program.					
e) Other Public Facilities?	**A-G**	✓			
Discussion: The size and capacity of necessary public utilities to serve the proposed project must be verified as part of the specific plan program. These include water lines, sanitary sewer, natural gas, electricity and cable.					

Issue	Information Sources (See Item 3.C Above)	Potentially Significant Impact	Less than Significant With Mitigation	Less Than Significant Impact	No Impact
14. Recreation:					
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	**B, C, E**			✓	
Discussion: As noted in item 13.d. above, the Cline Property Specific Plan will result in commercial development which will have a small impact on neighborhood and community park facilities; this impact will be mitigated through participation in a fee-based program at time of building permits.					
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	**B, C, E**				✓
Discussion: The proposed project does not include on-site recreational facilities. This project will not have a significant impact on public recreational facilities based on mitigation measures outlined above.					

Issue	Information Sources (See Item 3.C Above)	Potentially Significant Impact	Less than Significant With Mitigation	Less Than Significant Impact	No Impact
15. Transportation / Traffic: Would the project:					
a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?	**A-G**	✓			
Discussion: Overall traffic volumes associated with future development of the Cline property under the specific plan are expected to be equal or less than the figures documented in the General Plan EIR analysis. The local impact of this traffic on nearby streets and intersections, however, must be considered in connection with other anticipated future development in the area. A detailed traffic impact analysis must therefore be prepared to quantify such impacts and outline appropriate mitigation.					

b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	**A-G**	✓			
Discussion: Potential impacts to LOS standards, as established in the Oakley General Plan must be clearly documented in a focused traffic impact study to be carried out as part of the specific plan process.					
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that result in substantial safety risks?	**A-G**				✓
Discussion: None.					
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	**A-G**	✓			
Discussion: As discussed Section 15.a above, the effect of future development from this project in local intersections will be addressed through a detailed traffic impact assessment.					
e) Result in inadequate emergency access?	**A-G**	✓			
Discussion: Emergency access within the area will be improved as a result of the extension of Live Oak Avenue. Internal site circulation, however, must be addressed as part of the specific plan program in order to determine potential impacts and mitigation measures.					
f) Result in inadequate parking capacity?	**A-G**	✓			
Discussion: As discussed in Section 2B, the project is subject to compliance with all applicable Zoning Ordinance. Verification of compliance with all such regulations will be completed as part of the specific plan process and subsequent Design Review applications for individual buildings.					
g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	**A-G**				✓
Discussion: No conflicts would result from approval of the project.					

Issue	**Information Sources (See Item 3.C Above)**	**Potentially Significant Impact**	**Less than Significant With Mitigation**	**Less Than Significant Impact**	**No Impact**
16. Utilities and Service Systems: Would the project:					
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	**A-G**	✓			
Discussion: Projected demand from the specific plan program will be less than or equal to that anticipated with the 2020 Oakley General Plan EIR analysis. Due to the potential size of this project, however, these demands must be quantified and assessed in terms of the service provider's ability to serve the project.					

<table>
<tr><td>b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?</td><td>A-G</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td colspan="6">Discussion: See item 16 a) above.</td></tr>
<tr><td>c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?</td><td>A-G</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td colspan="6">Discussion: The potential need for new or expanded storm water drainage facilities must be further evaluated as part of the specific plan program and supplemental environmental analysis. This analysis will determine whether any such needed facilities could have adverse impacts on the environment. All project grading activities will comply with the requirements of the National Pollutant Discharge Elimination System (NPDES) Program, as established by the Clean Water Act. The City and Flood Control District will require the developer of this site to provide a Strom Water Pollution Prevention Plan (SWPPP) for review and approval.</td></tr>
<tr><td>d) Have significant water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?</td><td>A-G</td><td></td><td></td><td>✓</td><td></td></tr>
<tr><td colspan="6">Discussion: Adequate existing supplies are available to serve this site from current water sources, according to the analysis presented in the 2020 Oakley General Plan.</td></tr>
<tr><td>e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project’s projected demand in addition to the provider’s existing commitments?</td><td>A-G</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td colspan="6">Discussion: See item 16 a) above.</td></tr>
<tr><td>f) Be served by a landfill with sufficient permitted capacity to accommodate the project’s solid waste disposal needs?</td><td>A-G</td><td></td><td></td><td>✓</td><td></td></tr>
<tr><td colspan="6">Discussion: The proposed project will generate additional solid waste. Needed capacity to accommodate this project was included in the analysis contained in the General Plan EIR.</td></tr>
<tr><td>g) Comply with federal, state, and local statutes and regulations related to solid waste?</td><td>A-G</td><td></td><td></td><td>✓</td><td></td></tr>
<tr><td colspan="6">Discussion: All applicable requirements will be met in accordance with City and County ordinances.</td></tr>
</table>

<table>
<tr><th>Issue</th><th>Information Sources (See Item 3.C Above)</th><th>Potentially Significant Impact</th><th>Less than Significant With Mitigation</th><th>Less Than Significant Impact</th><th>No Impact</th></tr>
<tr><td colspan="6">17. Mandatory Findings of Significance:</td></tr>
<tr><td>a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?</td><td>A-G</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td colspan="6">Discussion: Impacts to the natural environment from the specific plan program are limited, and include potential aesthetic impacts and impacts to one special status animal species. These issues must be addressed as part of the specific plan program and through additional environmental analysis.</td></tr>
<tr><td>b) Does the project have impacts that are individually limited, but cumulatively considerable? (“Cumulatively considerable” means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)</td><td>A-G</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td colspan="6">Discussion: This project has the potential to create air quality, noise, traffic, utility and service demand impacts which, in combination with other anticipated development in the vicinity or within the Oakley Planning Area, could be significant.</td></tr>
<tr><td>c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?</td><td>A-G</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td colspan="6">Discussion: Future development of the Cline Property could result in significant impacts, unless appropriate mitigation is devised as part of the specific plan program pursuant to threshold standards as outlined in the General Plan EIR analysis.</td></tr>
</table>

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF TRANSPORTATION
111 GRAND AVENUE
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CITY OF OAKLEY

December 8, 2003

CC004737
CC-004-31.13
SCH2003112042

Mr. Barry Hand
City of Oakley
3639 Main Street
Oakley, CA 94561

Dear Mr. Hand:

Cline Property Specific Plan – Notice of Preparation

Thank you for including the California Department of Transportation (Department) in the early stages of the environmental review process for the above-referenced project. We have reviewed the Notice of Preparation and have the following comments to offer:

The Department is primarily concerned with impacts to the State Highway system. Specifically, the detailed Traffic Impact Analysis (TIA) should identify impacts to State Routes 4 and 160 with and without the proposed Cline Property Specific Plan project traffic. The TIA should include, but is not limited to the following:

1. Information on the project's traffic impacts in terms of trip generation, distribution, and assignment. The assumptions and methodologies used in compiling this information should be addressed.

2. Average Daily Traffic (ADT) and AM and PM peak hour volumes on all significantly affected streets and highways, including crossroads and controlling intersections.

3. Schematic illustration of the traffic conditions for: 1) existing, 2) existing plus project, and 3) cumulative for the intersections in the project area.

4. Calculation of cumulative traffic volumes should consider all traffic-generating developments, both existing and future, that would affect the State Highway facilities being evaluated.

5. Mitigation measures should consider highway and non-highway improvements and services. Special attention should be given to the development of alternate solutions to circulation problems that do not rely on increased highway construction.

6. All mitigation measures proposed should be fully discussed, including financing, scheduling, implementation responsibilities, and lead agency monitoring.

We recommend you utilize Caltrans' *"Guide for the Preparation of Traffic Impact Studies"* which can be accessed from the following webpage: http://www.dot.ca.gov/hq/traffops/developserv/operationalsystems/reports/tisguide.pdf

We look forward to reviewing the TIA, including Technical Appendices, and Draft Environmental Impact Report for this project. We expect to receive a copy from the State Clearinghouse, but in order to expedite our review, you may send two copies in advance to:

Lisa Carboni
Office of Transit and Community Planning
Department of Transportation, District 4
P.O. Box 23660
Oakland, CA 94623-0660

Please be advised that any work or traffic control within the State right-of-way (ROW) will require an encroachment permit from the Department. To apply for an encroachment permit, submit a completed encroachment permit application, environmental documentation, and five (5) sets of plans (in metric units) which clearly indicate State ROW to the following address:

Mr. Sean Nozzari, District Office Chief
Office of Permits
California Department of Transportation, District 04
P. O. Box 23660
Oakland, Ca 94623-0660

Should you have any questions regarding this letter, please call Lisa Carboni of my staff at (510) 622-5491.

Sincerely,

Timothy C. Sable

TIMOTHY C. SABLE
District Branch Chief
IGR/CEQA

c: Scott Morgan (State Clearinghouse)

Contra Costa County
FLOOD CONTROL
& Water Conservation District

Maurice M. Shiu
ex officio Chief Engineer

255 Glacier Drive, Martinez, CA 94553-4825
Telephone: (925) 313-2000
FAX (925) 313-2333

December 1, 2003

RECEIVED
DEC 04 2003
CITY OF OAKLEY

Barry Hand
City of Oakley
Community Development Department
P.O. Box 6
Oakley, CA 94561

Our File: 3029H-06
APN: 037-040-008,
3029H-00

Dear Mr. Hand:

We have reviewed the Notice of Preparation (NOP) of a Draft Environmental Impact Report (DEIR) for the Cline Property Specific Plan. This property is located on the north side of Main Street (State Route 4) between Bridgehead Road and Big Break Road. We received the NOP on November 10, 2003, and have the following comments:

1. The project is located in Drainage Area 29H (DA 29H). Future developments in this area will be subject to drainage fee in accordance with Flood Control Ordinance Number 98-55. By ordinance, all subdivision and development of property in this area is subject to the provisions of the drainage fee ordinance. The current fee in this drainage area is $0.60 per square foot of newly created impervious surface area. This fee pays for drainage improvements that help mitigate the increased runoff generated by new development. The City will need to collect the fees during the development process prior to issuance of building permits and/or the recordation of any Final or Parcel Maps.

2. The District is not the approving local agency for this project, as defined by the Subdivision Map Act. As a special district, the District has an independent authority to collect drainage fees that is not restricted by the Subdivision Map Act. The District reviews the drainage fee rate every year the ordinance is in effect and adjusts the rate annually on January 1 to account for inflation. The drainage fee rate does not vest at the time of tentative map approval. The drainage fees due and payable will be based on the fee in effect at the time of fee collection.

3. This development should be required to collect and convey all storm waters entering or originating within this project (without diversion of watershed) to the nearest natural watercourse or adequate man-made facility. The applicant should verify the adequacy of the downstream system.

4. According to the DA 29H Hydrology Map (DWG FD-12617), the project is tributary to DA 29H Lines A, B, and D. The project's northwest area should drain into Line D, the middle area should drain to Line A, and the east area should drain to Line B.

Our records indicate that the Lines A and B have been installed and Line D will need to be installed. Line A is located along Main Street (State Route 4), crosses the development site and BNSF Railroad, and outfalls into the channel connected to Big Break Marina. Line B is located west of Live Oak Avenue and runs north connecting to Line A at Main Street (State Route 4). Line D is proposed to traverse the project site and connect to the existing Line A.

Subdivision 7330 designed and constructed the existing 72-inch and 84-inch storm drain system of Line A to accept flows from Line D. However, a stub was not provided for Line D. Therefore, Line D should connect to Line A at the manhole at STA 20+56.72 (Subdivision 7330 Off-Site Drainage Improvement Plans), located south of BNSF Railroad right of way.

The Hydrology and Water Quality Section of the DEIR should discuss the construction of Line D. In order to avoid flooding impacts in this area, construction of Line D is a necessary mitigation and could be considered "potentially significant impact."

5. Work done in accordance with the DA 29H Plan will be eligible for fee credits and/or reimbursement. The District will need to review and approve the Improvement Plans for Line D in order to consider the eligible construction costs for fee credits and/or reimbursement.

6. The DA 29H Zoning Map (DWG FD-12602) assumed that this area would develop as Heavy Industrial. The NOP indicates that the specific plan will address the site for a range of possible commercial uses for this project. The DEIR should address any impacts of impervious surfaces for the range of possible commercial uses, on the downstream drainage system portion of the watershed.

We appreciate the opportunity to review the NOP and welcome continued coordination. We look forward to reviewing the DEIR, which should incorporate these comments. If you have any questions, please call me at (925) 313-2394 or Jocelyn LaRocque at (925) 313-2315.

Very truly yours,

Paul R. Detjens
Associate Civil Engineer
Flood Control Engineering

PRD:JL:jl/cw
G:\GrpData\FldCtl\CurDev\CITIES\Oakley\3029H-06\APN 037-040-008 (Cline Property)\NOP.doc

c: G. Connaughton, Flood Control
Jason Vogan, City of Oakley

RMC

Innovative Solutions for Water and the Environment

Raines, Melton & Carella, Inc.
Consulting Engineers/Project Managers

Randy Raines, P.E.
Lyndel Melton, P.E.
Lou Carella, P.E.
Marilyn Bailey, P.E.
Michael Matson, P.E.
Tom Richardson, P.E.
Steve Clary, P.E.
Dave Richardson, P.E.

December 2, 2003

RECEIVED
DEC 04 2003
CITY OF OAKLEY

Barry Hand, Director
City of Oakley – Community Development
3639 Main Street
Oakley, CA 94561

RE: Draft Environmental Impact Report
Cline Property Specific Plan

Dear Barry:

Ironhouse Sanitary District (ISD) is providing the following response to the Notice of Preparation of a Draft Environmental Impact Report (Draft EIR) for the project referenced above.

The Cline Property has been zoned as "commercial" in the City of Oakley General Plan and has been considered as such in ISD collection system and treatment capacity studies. ISD has recently completed a Draft Sewer Master Plan to address collection system capacity as well as a Wastewater Facilities Master Plan to address wastewater treatment plant (WWTP) capacity.

Collection System

The Cline Property will be served by an existing 18-inch trunk sewer in the Highway 4 (Main Street), to the south of the property. Currently, this line has excess capacity and is not an immediate cause for concern. However, as south-western Oakley continues to develop, wastewater flows through this trunk sewer will increase significantly. The 18-inch sewer will also serve all lands within the City of Oakley border north of the BNSF Railroad, an area zoned as commercial and light industrial. The increased wastewater loading from these service areas will require improvements to the collection system to allow proper conveyance to the ISD WWTP. The timing of these improvements will depend on the rate of development within all areas served by the Highway 4 trunk line. Downstream pump stations may also require upgrades to meet wastewater pumping demands. If development of the Cline Property occurs at a time when the collection system is at or near capacity, system improvements will be required to accommodate wastewater flows from the Specific Plan area.

Treatment and Disposal Facilities

The existing wastewater treatment plant has a maximum treatment capacity of 3 million gallons per day (mgd) and an average flow rate of 2.1 mgd. The ISD Wastewater Facilities Master Plan calls for expansion of the plant to an ultimate capacity of approximately 8 mgd. ISD's goal is to provide sufficient capacity to meet wastewater treatment and disposal demands over time. However, it is not possible to determine exactly when the existing treatment capacity will be exceeded. While the goal is to have new facilities online before this occurs, development of the Cline Property may occur when the treatment or disposal capacity has reached a critical point. In this case, WWTP capacity would be significantly impacted.

I hope that this information proves useful in the preparation of the Cline Property Specific Plan Draft EIR. Please feel free to contact me with any questions or concerns. I may be reached at 925-625-2279 (ISD offices) or 925-299-6733 (RMC).

Sincerely,

Raines, Melton & Carella, Inc.
Consulting Engineer

Tony Valdivia

Tony Valdivia
IRONHOUSE SANITARY DISTRICT

Cc: Tom Williams, Ironhouse Sanitary District

East Contra Costa Irrigation District

November 7, 2003

Mr. Barry Hand
Community Development Department
City of Oakley
3639 Main Street
Oakley, CA 94561

RECEIVED
NOV [illegible] 2003
CITY OF OAKLEY

Subject: Cline Property Specific Plan
NOP of Draft EIR

Dear Mr. Hand:

This is to advise you that the East Contra Costa Irrigation District does not have any facilities within the project area. Therefore, we have no comments on the Notice of Preparation for the Cline Property Specific Plan.

Thank you for the opportunity to review the proposed plan. Please feel free to call me at 634-5951 should you have any questions.

Sincerely,

Pat Corey

Pat Corey
Development Services Coordinator

Oakley-N/C

626 First Street • Brentwood, California 94513-0696
Telephone (925) 634-3544 FAX (925) 634-0897

STATE OF CALIFORNIA
Governor's Office of Planning and Research
State Clearinghouse

Gray Davis
Governor

Tal Finney
Interim Director

Notice of Preparation

November 10, 2003

RECEIVED
NOV 14 2003
CITY OF OAKLEY

To: Reviewing Agencies

Re: Cline Specific Plan
SCH# 2003112042

Attached for your review and comment is the Notice of Preparation (NOP) for the Cline Specific Plan draft Environmental Impact Report (EIR).

Responsible agencies must transmit their comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOP from the Lead Agency. This is a courtesy notice provided by the State Clearinghouse with a reminder for you to comment in a timely manner. We encourage other agencies to also respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

Barry Hand
City of Oakley
3639Main Street
Oakley, CA 94561

with a copy to the State Clearinghouse in the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the environmental document review process, please call the State Clearinghouse at (916) 445-0613.

Sincerely,

Scott Morgan
Associate Planner, State Clearinghouse

Attachments
cc: Lead Agency

1400 TENTH STREET P.O. BOX 3044 SACRAMENTO, CALIFORNIA 95812-3044
(916)445-0613 FAX(916)323-3018 www.opr.ca.gov

Document Details Report
State Clearinghouse Data Base

SCH# **2003112042**
Project Title Cline Specific Plan
Lead Agency Oakley, City of

Type **NOP** Notice of Preparation

Description The specific plan will provide for a range of retail and service oriented uses on the 71-acre project site, consistent with the current General Plan classification of commercial.

Lead Agency Contact

Name Barry Hand
Agency City of Oakley
Phone 925-625.7000 ***Fax***
email
Address 3639Main Street
City Oakley ***State*** CA ***Zip*** 94561

Project Location

County Contra Costa
City Oakley
Region
Cross Streets Main Street & Bridge Head
Parcel No. 037-040-015
Township ***Range*** ***Section*** ***Base***

Proximity to:

Highways 4
Airports
Railways BN & SF
Waterways Delta
Schools Oakley Elementary
Land Use The existing land use designation is commercial with a heavy industrial zoning. The property will need to be rezoned to comply with the General Plan designation.

Project Issues Aesthetic/Visual; Agricultural Land; Air Quality; Archaeologic-Historic; Noise; Public Services; Sewer Capacity; Traffic/Circulation; Water Quality; Water Supply

---

Reviewing Agencies Resources Agency; Department of Boating and Waterways; Department of Parks and Recreation; Reclamation Board; Department of Water Resources; Department of Fish and Game, Region 3; Delta Protection Commission; Native American Heritage Commission; State Lands Commission; California Highway Patrol; Caltrans, District 4; Regional Water Quality Control Bd., Region 5 (Sacramento)

Date Received 11/10/2003 ***Start of Review*** 11/10/2003 ***End of Review*** 12/09/2003

Note: Blanks in data fields result from insufficient information provided by lead agency.

NOP Distribution List

County: Contra Costa

SCH# 2003112042

Resources Agency

☒ **Resources Agency**
Nadell Gayou

☒ **Dept. of Boating & Waterways**
Suzi Betzler

☐ **California Coastal Commission**
Elizabeth A. Fuchs

☐ **Colorado River Board**
Gerald R. Zimmerman

☐ **Dept. of Conservation**
Roseanne Taylor

☐ **California Energy Commission**
Environmental Office

☐ **Dept. of Forestry & Fire Protection**
Allen Robertson

☐ **Office of Historic Preservation**
Hans Kreutzberg

☒ **Dept of Parks & Recreation**
B. Noah Tilghman
Environmental Stewardship Section

☒ **Reclamation Board**
Lori Buford

☐ **Santa Monica Mountains Conservancy**
Paul Edelman

☐ **S.F. Bay Conservation & Dev't. Comm.**
Steve McAdam

☒ **Dept. of Water Resources**
Resources Agency
Nadell Gayou

Fish and Game

☐ **Dept. of Fish & Game**
Scott Flint
Environmental Services Division

☐ **Dept. of Fish & Game 1**
Donald Koch
Region 1

☐ **Dept. of Fish & Game 2**
Banky Curtis
Region 2

☒ **Dept. of Fish & Game 3**
Robert Floerke
Region 3

☐ **Dept. of Fish & Game 4**
William Laudermilk
Region 4

☐ **Dept. of Fish & Game 5**
Don Chadwick
Region 5, Habitat Conservation Program

☐ **Dept. of Fish & Game 6**
Gabrina Gatchel
Region 6, Habitat Conservation Program

☐ **Dept. of Fish & Game 6 I/M**
Tammy Allen
Region 6, Inyo/Mono, Habitat Conservation Program

☐ **Dept. of Fish & Game M**
Tom Napoli
Marine Region

Other Departments

☐ **Food & Agriculture**
Steve Shaffer
Dept. of Food and Agriculture

☐ **Dept. of General Services**
Robert Sleppy
Environmental Services Section

☐ **Dept. of Health Services**
Wayne Hubbard
Dept. of Health/Drinking Water

Independent Commissions,Boards

☒ **Delta Protection Commission**
Debby Eddy

☐ **Office of Emergency Services**
John Rowden, Manager

☐ **Governor's Office of Planning & Research**
State Clearinghouse

____

☒ **Native American Heritage Comm.**
Debbie Treadway

☐ **Public Utilities Commission**
Ken Lewis

☒ **State Lands Commission**
Jean Sarino

☐ **Tahoe Regional Planning Agency (TRPA)**
Lyn Barnett

Business, Trans & Housing

☐ **Caltrans - Division of Aeronautics**
Sandy Hesnard

☐ **Caltrans - Planning**
Ron Helgeson

☒ **California Highway Patrol**
Lt. Julie Page
Office of Special Projects

☐ **Housing & Community Development**
Cathy Creswell
Housing Policy Division

Dept. of Transportation

☐ **Dept. of Transportation 1**
Mike Eagan
District 1

☐ **Dept. of Transportation 2**
Don Anderson
District 2

☐ **Dept. of Transportation 3**
Jeff Pulverman
District 3

☒ **Dept. of Transportation 4**
Tim Sable
District 4

☐ **Dept. of Transportation 5**
David Murray
District 5

☐ **Dept. of Transportation 6**
Marc Birnbaum
District 6

☐ **Dept. of Transportation 7**
Stephen J. Buswell
District 7

☐ **Dept. of Transportation 8**
Linda Grimes,
District 8

☐ **Dept. of Transportation 9**
Gayle Rosander
District 9

☐ **Dept. of Transportation 10**
Tom Dumas
District 10

☐ **Dept. of Transportation 11**
Bill Figge
District 11

☐ **Dept. of Transportation 12**
Bob Joseph
District 12

Cal EPA

Air Resources Board

- ☐ Airport Projects
  Jim Lerner
- ☐ Transportation Projects
  Kurt Karperos
- ☐ Industrial Projects
  Mike Tollstrup

☐ **California Integrated Waste Management Board**
Sue O'Leary

☐ **State Water Resources Control Board**
Jim Hockenberry
Division of Financial Assistance

☐ **State Water Resources Control Board**
Student Intern, 401 Water Quality Certification Unit
Division of Water Quality

☐ **State Water Resouces Control Board**
Mike Falkenstein
Division of Water Rights

☐ **Dept. of Toxic Substances Control**
CEQA Tracking Center

Regional Water Quality Control Board (RWQCB)

☐ **RWQCB 1**
Cathleen Hudson
North Coast Region (1)

☐ **RWQCB 2**
Environmental Document Coordinator
San Francisco Bay Region (2)

☐ **RWQCB 3**
Central Coast Region (3)

☐ **RWQCB 4**
Jonathan Bishop
Los Angeles Region (4)

☒ **RWQCB 5S**
Central Valley Region (5)

- ☐ **RWQCB 5F**
  Central Valley Region (5)
  Fresno Branch Office
- ☐ **RWQCB 5R**
  Central Valley Region (5)
  Redding Branch Office

☐ **RWQCB 6**
Lahontan Region (6)

- ☐ **RWQCB 6V**
  Lahontan Region (6)
  Victorville Branch Office

☐ **RWQCB 7**
Colorado River Basin Region (7)

☐ **RWQCB 8**
Santa Ana Region (8)

☐ **RWQCB 9**
San Diego Region (9)

☐ **Other** ________________
____
____

PG&E
Pacific Gas and
Electric Company

Diablo Division
2111 Hillcrest Avenue
Antioch, CA 94509

RECEIVED
NOV 21 2003
CITY OF OAKLEY

November 19, 2003

Mr. Barry Hand
City of Oakley
3639 Main Street
Oakley, CA 94561

Re: Cline Property
Main St. E/Bridgehead Rd., Oakley

Dear Mr. Hand:

Thank you for the opportunity to review and comment on the above referenced project.

PG&E has adequate gas and electric facilities in the area to serve this proposed project. These facilities will be extended to serve this proposed project under the appropriate gas and electric tariffs on file with the California Public Utilities Commission (CPUC) at the time a request for service is made by the developer.

There appears to be no major conflicts with this proposed project and PG&E's existing gas and electric facilities. Upon submittal of development plans, should any relocation of PG&E's facilities become necessary, they will be relocated at the requesting party's expense.

Should you have any questions, please contact me at (925) 779-7714.

Sincerely,

Gene Tedder
Senior New Business Representative

ELT:alt

2107 Main St.
P.O. Box 127
Oakley, CA 94561-0127
925 • 625 • 3798
Fax 925 • 625 • 0814

November 13, 2003

Mr. Barry Hand
City of Oakley
3639 Main Street
P.O. Box 6
Oakley, CA 94561

RECEIVED
NOV 17 2003
CITY OF OAKLEY

Subject: Notice of Preparation – Cline Property Specific Plan

Dear Mr. Hand:

We have reviewed the Environmental Initial Study checklist for the subject project and find that Item 16 d), regarding water supply to the project area and would like to confirm that there are adequate existing supplies to serve the area.

Sincerely,

Mike Yeraka, P.E.
General Manager

cc: Jerry Brown, CCWD

Appendix B

Scoping Meeting Notice, Agenda, and Summary Memorandum

October 30, 2003

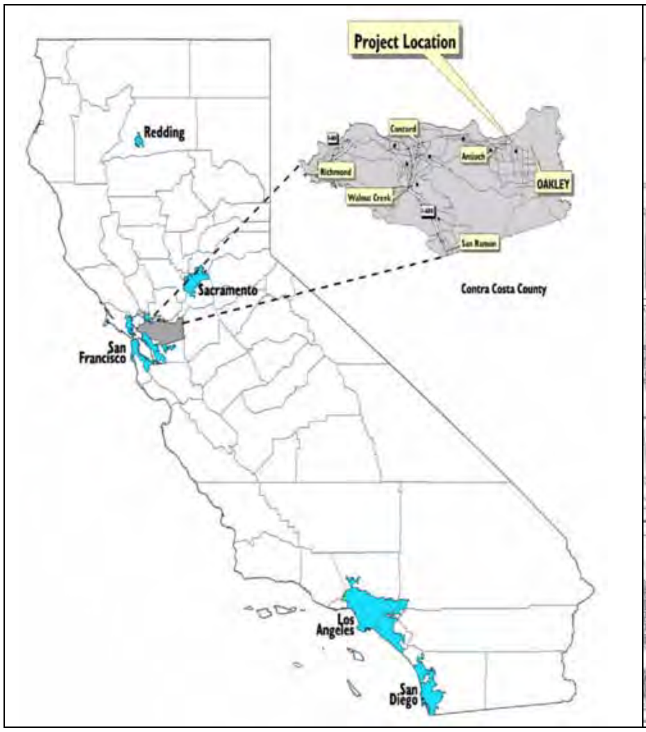
City of Oakley
A Place for Families in the Heart of the Delta

NOTICE OF PUBLIC SCOPING MEETING FOR CLINE PROPERTY SPECIFIC PLAN EIR

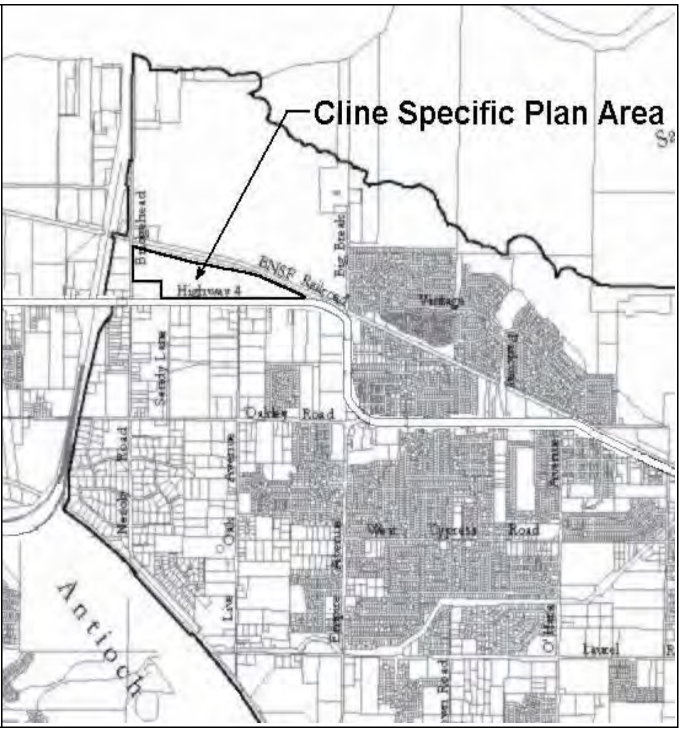
The City of Oakley Community Development Department will be the Lead Agency for preparation of an Environmental Impact Report (EIR) for the Cline Property Specific Plan, in conformance with the California Environmental Quality Act (CEQA). The City's Redevelopment Agency has commenced work on a specific plan to guide future development of this property as described below. We are interested in hearing from nearby property owners, interested individuals, groups, organizations and agencies who may be affected by this project. A public meeting has been scheduled for the purpose of presenting preliminary information about the project, and to obtain public comments concerning the scope of issues to be studied in the draft EIR. Following is a summary of the project and the upcoming scoping meeting:

PROJECT LOCATION:

The Cline Property Specific Plan area is located in the northwesterly portion of the City of Oakley in Contra Costa County. The 71-acre site is situated on the north side of Main Street (State Route 4) between Bridgehead Road and Big Break Road, immediately east of State Route 160 (see vicinity and project area maps below).



Regional Vicinity Map



Project Area Location Map

PROJECT DESCRIPTION:

The City of Oakley Redevelopment Agency is sponsoring the preparation of a specific plan to guide future development of the 71-acre Cline Property. In accordance with the City of Oakley 2020 General Plan, the specific plan will address a range of possible commercial uses for the property. The specific plan will identify needed roadway and infrastructure improvements to serve the project site and surrounding area, and will propose a set of development standards and design guidelines for future buildings and site improvements. Because future development contemplated in the specific plan could have a variety of potentially significant environmental effects, as summarized below, an Environmental Impact Report will be prepared. The EIR will analyze these effects and explore various means by which to avoid or reduce project impacts.

POTENTIAL SIGNIFICANT ENVIRONMENTAL EFFECTS:

Based on information prepared as part of an environmental Initial Study for the Cline Property Specific Plan, it has been determined that several potentially significant effects could result from implementation of the project. These impacts involve the following areas of review: Aesthetics, Agricultural Resources, Air Quality, Biological Resources, Cultural Resources, Geology and Soils, Hazardous Materials, Hydrology and Water Quality, Noise, Public Services, Transportation and Traffic, and Utilities and Service Systems.

TIME AND PLACE OF MEETING:

A public scoping meeting will be held for the purpose of presenting preliminary information about the project and the specific plan process, and to obtain public comments. The meeting will be held beginning at **7:00 pm on Wednesday, November 12, 2003** at the following location:

Delta Vista Middle School - Library
4901 Frank Hengel Way
Oakley, CA 94561

If you would like to learn more about the specific plan process for the Cline Property, or the draft environmental impact report for this project, please stop by City offices at 3639 Main Street or call us at (925) 625-7000. We look forward to your comments and welcome your participation on November 12, 2003. You may also submit your written comments concerning the scope of this EIR to us within 30 days of this notice at the address above.

Sincerely,

Barry Hand
Community Development Director

Public Scoping Meeting
City of Oakley / Cline Property Specific Plan

November 12, 2003 7:00 pm

Delta Vista Middle School – Library, 4901 Frank Hengel Way, Oakley, CA 94561

Agenda

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1. Introduction

A. Welcome and Introduction of City's EIR Consultants
B. Identification of Cline Property
C. Notice of Preparation and Decision to Prepare a Focused EIR

2. Oakley 2020 General Plan

A. Commercial Land Use Classification for Cline Property
B. Widening of Main Street
C. Extension of Live Oak Avenue
D. Anticipated Future Development within Study Area
E. Economic Development Policies

3. Site Characteristics

A. Existing Land Use
B. Soils, Topography, Drainage and Utilities
C. Surrounding Land Uses
D. Access and Circulation

4. Scope of Specific Plan

A. Preliminary Land Use Plan and Alternatives
B. Development Standards and Design Guidelines

5. Scope of EIR

A. Initial Study and NOP
B. Focused Analysis of Aesthetics, Air Quality, Biological Resources, Cultural Resources, Geology and Soils, Hazards and Hazardous Materials, Hydrology and Water Quality, Noise, Public Services, Transportation and Traffic, Utility and Service Systems.

6. Public Questions and Comments

RICHARD T. LOEWKE, AICP
URBAN & ENVIRONMENTAL PLANNING

E-MAIL MEMO

To: Ellen Bonneville, City of Oakley Redevelopment
Barry Hand, City of Oakley Community Development
From: Richard T. Loewke, AICP
Phone/FAX: 925.831.8016
Date: 11.14.2003 **E-Mail:** Dick@LoewkeAICP.com
Subject: **Cline Property Specific Plan Public Scoping Meeting Notes**

A public scoping meeting was held on November 12, 2003, in accordance with Section 15083 of the CEQA Guidelines, for the purpose of obtaining public comments on the City's determination to prepare an environmental impact report for the Cline Property Specific Plan. Notice of this meeting was circulated to adjoining property owners and other interested individuals and organizations on or shortly after October 30, 2003. A copy of the meeting agenda is attached for your files.

The scoping meeting was held at Delta Vista middle School, and ran from 7:00 pm to approximately 9:00 pm. Following is a list of meeting participants:

1. Bob Deaver, DuPont, 6000 Bridgehead Road, Oakley, CA 94561
2. Dave Biron, Big Break Marina, 100 Big Break Road, Oakley, CA 94561
3. Rana Barritt, 1683 Main Street, Oakley, CA 94561
4. Joshua Barritt, 1683 Main Street, Oakley, CA 94561
5. Ken Graunstadt, 1371 Main Street, Oakley, CA 94561
6. Gary Willson (415) 924-3541 (Mobile Home Park owner)
7. Martha Mary Willson (415) 924-3541 (Mobile Home Park owner)
8. Bobby L. Robertson, 5625 Sandmound Blvd., Oakley, CA 94561

The meeting began with the Agency's consultant, Dick Loewke, providing a presentation of background information concerning preparation of the specific plan (following the meeting agenda). Copies of the NOP, Meeting Notice and Agenda were made available to the public.

After the presentation, a number of questions were asked of the consultant, with some answers provided, where information was available:

1. Q (Mr. Biron): What is the reason for preparing an EIR for the specific plan, and what is the source of funding for this work? A (Mr. Loewke): An EIR is required based on preliminary analysis of issues under CEQA and the determination made in the Initial Study (copy of which was reviewed). Funding has been provided by the Redevelopment Agency.

2. Q (Mr. Graunstadt): Speaker has operated an auto dismantling business at the same location across from the Cline property for 28 years on 6.5-7.0 acres currently planned for commercial uses under the General Plan. He wants to continue this business indefinitely. A (Mr. Loewke): Comment noted.
3. Q (Mr. Graunstadt): What improvements are planned to Main Street? Will this represent a financial burden to the other abutting property owners? A (Mr. Loewke): The City is proceeding with preliminary design work for a widening of Main Street between Highway 160 and Big Break Road; this work is being planned independently of the specific plan process, with complete funding through the City's Capital Improvement Program. Jason Vogan, the City Engineer, may be contacted for further information. The EIR will provide a more complete analysis of improvement costs and the CIP program.
4. Q (Mrs. Barritt): Will Mr. Cline sell this property to a developer to complete the project, and will this involve a subdivision of the 71-acre site? A (Mr. Loewke): It is possible for the property to be sold to a developer who would complete the subdivision and secure tenant leases; the EIR will discuss this process in greater detail.
5. Q (Mr. Barritt): Will architectural plans be prepared for the project as part of the specific plan? A (Mr. Loewke): The specific plan will include a set of design guidelines and development standards, intended to unify the various anticipated buildings on the site. The specific architectural plans for each major building will be processed subsequently by the City, and checked for consistency with specific plan policies. This process will be discussed in the EIR.
6. Q (Mr. Graunstadt): If a raised median is installed down the center of Main Street, will left turn movements from properties on the south side of the street be prohibited? Will the Live Oak Avenue intersection be designed to accommodate u-turn movements for semi-truck/trailers? A (Mr. Loewke): The Main Street improvement project is separate from the specific plan; the EIR will address the relationship between planned improvements on Main Street and frontage improvements to the Cline property. Vehicular movements from adjoining properties will also be addressed in the EIR.
7. Q (Mr. Willson): The Cline property may take access to Bridgehead Road; what affect will the added traffic have on access from adjoining properties on Bridgehead Road? A (Mr. Loewke): The EIR will look specifically at the speaker's mobile home park access arrangements, and will address future points of access from the project. Any impacts will be addressed with appropriate mitigation.
8. Q (Mr. Graunstadt): How can the segment of Main Street through downtown Oakley be limited to four lanes when the portion west of Big Break Road will go to six lanes? A (Mr. Loewke): The westerly portion of Main Street will experience the greatest volume of traffic, due to the planned growth of businesses both north and south of Main Street in this vicinity. The EIR will examine future traffic volumes at local intersections in the vicinity of the project; the General Plan has already identified the ultimate capacity needs of Main Street throughout Oakley.
9. Q (Mr. Graunstadt): Main Street s a part of the old Victory Highway System developed in the 1920's. A (Mr. Loewke): Comment noted.

10. Q (Mr. Willson): Future project traffic may create circulation conflicts and congestion for residents of the mobile home park directly across Bridgehead Road. Glare from the parking lot lighting may also be a concern to residents of the mobile home park. In addition, increased noise will also be of concern, as has already been experienced by the new hotel adjoining the mobile home park. If the mobile home park closes, its residents would need to be relocated, and the speaker (who bought the park in 1990) does not want to see that happen. A (Mr. Loewke): The EIR will address planned access to the Cline property onto Bridgehead Road, as well as lighting and possible noise from retail uses.
11. Q (Mrs. Wilson): The recently constructed hotel use brought more objectionable noise to the mobile home park. This noise appears to be caused by activity in the swimming pool and activities in the parking lot, both at night. A (Mr. Loewke): The EIR for the Cline property will examine the current noise level in the vicinity of the project, and will address potential increases in noise which might be of concern to residents of the mobile home park.
12. Q (Mr. Wilson): What wages will the businesses in the shopping center pay? A (Mr. Loewke): Wages are set by the individual businesses, but are influenced by the type of land use planned. The Cline property is planned for retail uses. The EIR will provide additional details on the types of land uses to be accommodated within the project; however, wages are not an issue directly addressed through CEQA.

Appendix C

Transportation Impact Analysis

Transportation Impact Analysis

Cline Specific Plan

May 2007

Prepared for:
City of Oakley

FEHR & PEERS
TRANSPORTATION CONSULTANTS

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1. INTRODUCTION

This chapter discusses the study purpose, the organization of this report, and the methods used in the transportation impact analysis.

STUDY PURPOSE

The study purpose is to evaluate the off-site transportation system impacts of the project, and assess site access, circulation, and parking. This report presents the findings, conclusions, and recommendations of the transportation impact analysis conducted by Fehr & Peers for the proposed 770,000 square foot retail development on the Cline property in the City of Oakley. The project site is located on Main Street (State Route [SR] 4), as shown on Figure 1. A conceptual site plan of the project site is shown on Figure 2.

REPORT ORGANIZATION

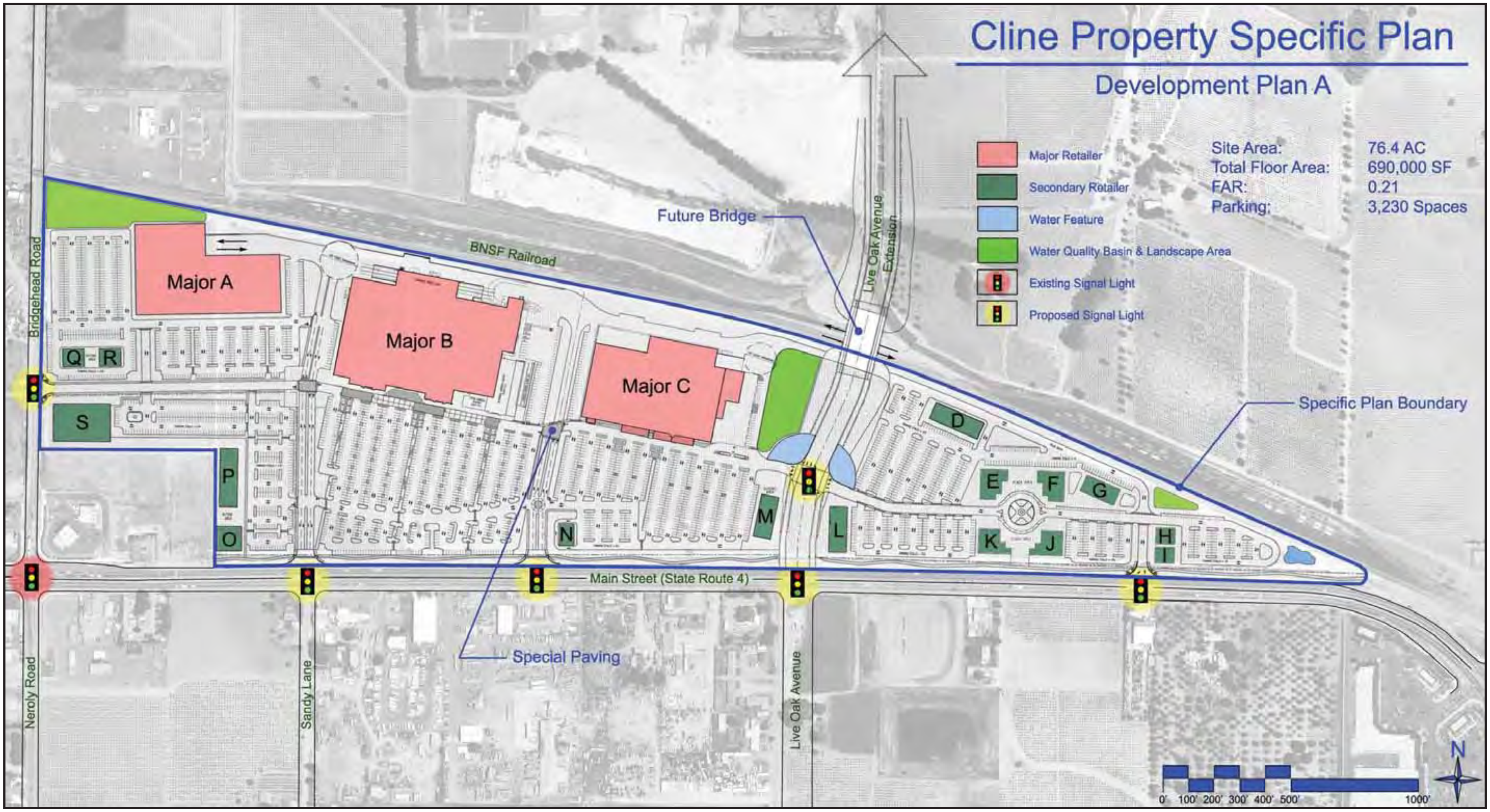
This report is divided into six chapters as described below:

- Chapter I – ***Introduction*** discusses the purpose and organization of this report.
- Chapter II – ***Setting*** describes the project area, including the surrounding roadway network, existing morning (AM) and evening (PM) peak hour traffic volumes, and intersection levels of service.
- Chapter III – ***Project Characteristics*** presents the methods used to estimate project-generated traffic, including trip generation, distribution, and assignment.
- Chapter IV – ***Near Term (Year 2010) Traffic Conditions*** describes near term conditions, both without and with the project.
- Chapter V – ***Cumulative (Year 2030) Traffic Conditions*** addresses long-term future conditions, both without and with the project.
- Chapter VI – ***Site Access, Circulation, and Parking*** provides an assessment of project access, circulation, and parking.

STUDY LOCATIONS AND FORECAST SCENARIOS

Transportation system impacts of the project were evaluated at intersections, as intersections are the locations on the roadway system where congestion occurs. The study intersections listed below were selected because a preliminary project trip generation analysis indicated that they would meet the definition for study intersections provided in the Contra Costa Transportation Authority (CCTA) *Technical Procedures Update*, July, 2006. The location of each intersection is shown on Figure 1.

1. Wilbur Avenue/Minaker Drive
2. Wilbur Avenue/Viera Avenue
3. Wilbur Avenue/SR 160 Southbound Ramps
4. Wilbur Avenue/SR 160 Northbound Ramps
5. Wilbur Avenue/Bridgehead Road
6. East 18th Street/Hillcrest Avenue
7. East 18th Street/Viera Avenue
8. East 18th Avenue/Phillips Lane
9. Main Street/SR 160 Southbound Ramps
10. Main Street/SR 160 Northbound Ramps
11. Main Street/Bridgehead Road/Neroly Road
12. Main Street/Sandy Lane
13. Main Street/Live Oak Avenue
14. Main Street/Big Break Road



Cline Specific Plan

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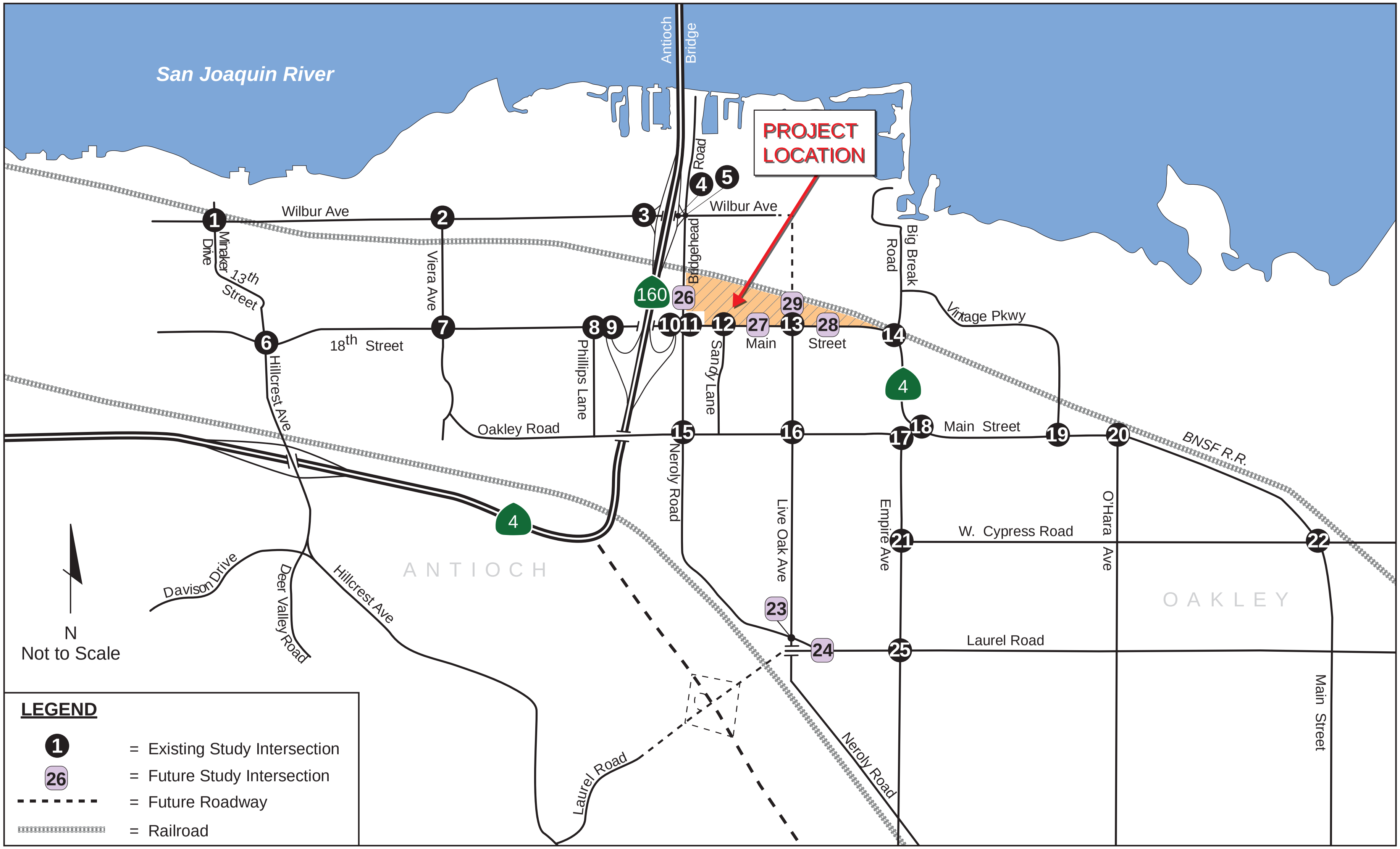
PROJECT SITE PLAN

Figure 2



Cline Specific Plan

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PROJECT LOCATION AND STUDY INTERSECTIONS

Figure 1

15. Oakley Road/Neroly Road
16. Oakley Road/Live Oak Avenue
17. Oakley Road/Empire Avenue
18. Main Street/Empire Avenue
19. Main Street/Vintage Parkway
20. Main Street/O'Hara Avenue
21. Cypress Road/Empire Avenue
22. Cypress Road/Main Street
23. Neroly Road/Live Oak Avenue (future)
24. Live Oak Avenue/Laurel Road (future)
25. Laurel Road/Empire Avenue
26. Bridgehead Road/Project Driveway (future)
27. Main Street/Project Driveway Center (future)
28. Main Street/Project Driveway East (future)
29. Live Oak Avenue/Project Driveway (future)

In addition, as required by CCTA, project impacts on freeway segments were also evaluated. The study freeways include the existing SR 4 freeway between the Hillcrest Avenue and Main Street interchanges, SR 160 between Main Street and the Antioch Bridge Toll Plaza, and the under construction SR 4 Bypass between SR 4 and Lone Tree Way.

For this study, the following scenarios were evaluated:

- ***Existing*** – Existing conditions based on existing traffic volumes obtained from counts and existing roadway geometries.
- ***Near Term No Project*** – Near term (Year 2010) forecast conditions based on near term future approved developments and roadway improvements.
- ***Near Term Plus Project*** – Near Term conditions plus project-related traffic.
- ***Cumulative No Project*** – Future (Year 2030) forecast conditions based on the City of Oakley General Plan buildout and all planned roadway improvements.
- ***Cumulative Plus Project*** – Future (Year 2030) forecast conditions with General Plan Buildout plus project-related traffic.

The cumulative scenarios were evaluated for conditions with and without the SR 4 Bypass – SR 160 connector ramps because the ramps are not yet funded. The analysis of the conditions with the connector ramps is presented in Chapter 5, and the analysis of the conditions without the connector ramps is presented in Appendix E. Thus, if the connector ramps between SR 4 Bypass and SR 160 are not constructed, impacts and mitigations presented in Appendix E would be applicable instead of the impacts and mitigations presented in chapter 5.

ANALYSIS METHODS

Study intersection operations were evaluated using level of service calculations. The analysis method outlined in *Technical Procedures Update* prepared by the Contra Costa Transportation Authority (CCTA) (July, 2006), known as CCTALOS, was utilized. To augment this analysis, the Transportation Research Board's 2000 *Highway Capacity Manual* (HCM) method and Synchro software were also used.

Signalized Intersections

To measure and describe the operational status of a local roadway network, transportation engineers and planners commonly use a grading system called level of service (LOS). LOS is a description of an intersection's operation, ranging from LOS A, indicating free-flow traffic conditions with little or no delay experienced by motorists, to LOS F, which describes congested conditions where traffic flows exceed design capacity, resulting in long queues and delays.

At each signalized study intersection, traffic conditions were evaluated using the CCTALOS and HCM methods. The CCTA planning-level analysis uses various intersection characteristics (i.e., traffic volumes, lane geometry, and signal phasing) to estimate the volume-to-capacity (v/c) ratio of an intersection. HCM operations analysis uses various intersection characteristics (i.e., traffic volumes, lane geometry, signal timing, and pedestrian activity) to estimate the average delay (measured in seconds per vehicle) experienced by motorists traveling through an intersection. Table 1 summarizes the relationship between the v/c ratio, delay, and LOS for signalized intersections.

TABLE 1
SIGNALIZED INTERSECTION LOS CRITERIA

LOS	CCTALOS	HCM	Description
	Sum of Critical V/C Ratio	Average Control Delay per Vehicle (seconds)	
A	< 0.60	≤ 10.0	This LOS occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
B	0.61 - 0.70	10.1 to 20.0	This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of average delay.
C	0.71 - 0.80	20.1 to 35.0	Higher congestion may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level, though many still pass through the intersection without stopping.
D	0.81 - 0.90	35.1 to 55.0	At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	0.91 - 1.00	55.1 to 80.0	This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. The individual cycle failures are frequent occurrences.
F	> 1.00	> 80.0	This level, considered unacceptable, occurs when arrival flow rates exceed the capacity of the intersection. Poor progression and long cycle lengths may also be contributing factors to high delay levels.

Source: *Technical Procedures,* Contra Costa Transportation Authority, 1997.

Unsignalized Intersections

For unsignalized (all-way stop-controlled and side-street stop-controlled) intersections, Chapter 17 of the Transportation Research Board's 2000 HCM method was used. With this method, the LOS ranking is related to the total average delay for each intersection movement, including those not controlled by a stop sign. Total delay is defined as the amount of time required for a driver to stop at the back of the queue, move to the first-in-queue position, and depart from the queue into the intersection. Table 2 summarizes the relationship between delay and LOS for unsignalized intersections. Typically, the delay and LOS for the worst-movement from the side-street is also reported for side-street stop-controlled intersections. Synchro software was used to calculate HCM-based LOS for unsignalized intersections.

TABLE 2
UNSIGNALIZED INTERSECTION LOS CRITERIA

Level of Service	Description	Average Control Delay Per Vehicle (Seconds)
A	Little or no delays	< 10.0
B	Short traffic delays	> 10.0 to 15.0
C	Average traffic delays	> 15.0 to 25.0
D	Long traffic delays	> 25.0 to 35.0
E	Very long traffic delays	> 35.0 to 50.0
F	Extreme traffic delays with intersection capacity exceeded	> 50.0

Source: Highway Capacity Manual, Transportation Research Board, 2000.

SIGNIFICANCE CRITERIA

Intersections

Based on the adopted policies of CCTA and the Cities of Oakley and Antioch, a significant traffic impact would occur if the addition of project-related traffic would result in any of the following; the specific acceptable and unacceptable levels of service vary depending on the intersection, and are identified in Table 3:

- Operations of a signalized study intersection to decline from an acceptable level to an unacceptable level (service levels are defined in Table 3 for each study intersection); or,
- Deterioration in already unacceptable operations at a signalized intersection by a change in V/C ratio of more than 0.01 or a change in average delay of more than 5 seconds; or,
- Operations of an unsignalized study intersection to decline from an acceptable level to an unacceptable level (as defined in Table 3), and the need for installation of a traffic signal at an unsignalized intersection, based on the *Manual on Uniform Traffic Control Devices* (MUTCD) Peak Hour Signal Warrant (Warrant 3); or,
- Operations of a freeway segment to exceed the established Delay Index standard; or,
- Deterioration in a freeway segment that already exceeds the established Delay Index standard by increasing the freeway volume by more than 1%; or,

- Substantially increased hazards or congestion due to a design feature (e.g., sharp curves) or incompatible uses (e.g., farm equipment); or,
- Inadequate emergency access; or,
- Conflicts with adopted alternative transportation policies, plans, or programs.

Freeway Segments

The *East County Action Plan* (CCTA, 2000) establishes traffic service objectives (TSO) for routes of regional significance in eastern Contra Costa County. The TSO used to measure freeway operations is peak hour Delay Index. Delay Index is defined as the ratio of the peak hour congested travel time to free-flow travel time on each freeway segment. For example, a Delay Index of 2.0 means that it takes twice as long to travel a particular segment during the peak commute hour than during non-commute hours when traffic moves at free-flow speeds.

Objectives for relevant routes include a Delay Index of 2.5 for SR 4 freeway. The routes of regional significance affected by the project are SR 4 (both freeway and non-freeway segments), and SR 4 Bypass.

TABLE 3
INTERSECTION LOS THRESHOLDS

Study Location	LOS Threshold	Source
Signalized intersections along Main Street • Main Street/Bridgehead Road/Neroly Road (#11) • Main Street/Live Oak Avenue (#13, Signal currently being installed by City of Oakley) • Main Street/Big Break Road (#14) • Main Street/Empire Avenue (#18) • Main Street/Vintage Parkway (#19) • Main Street/O'Hara Avenue (#20) • Main Street/Cypress Road (#22)	LOS D (Avg. Delay = 55 sec. V/C = 0.90)	East County Action Plan for Routes of Regional Significance
Unsignalized intersections along Main Street • Main Street/Sandy Lane (#12) • Main Street/Live Oak Avenue (#13, pre-signalization)	LOS E (Delay = 50 sec)	East County Action Plan for Routes of Regional Significance
Signalized intersections on Basic Routes in Oakley • Oakley Road/Empire Avenue (#17) • Cypress Road/Empire Avenue (#21)	LOS D (Avg. Delay = 55 sec. V/C = 0.90)	City of Oakley General Plan
Unsignalized intersections on Basic Routes in Oakley • Oakley Road/Neroly Road (#15) • Oakley Road/Live Oak Avenue (#16) • Laurel Road /Empire Avenue (#25) • Wilbur Ave/Bridgehead Road (#5)	LOS D (Delay = 35 sec.)	City of Oakley General Plan
Signalized intersections on Basic Routes in Antioch, within 1,000 feet of a freeway interchange • Main Street/SR 160 Southbound Ramps (#9) • Main Street/SR 160 Northbound Ramps (#10)	Mid-LOS E (Avg Delay = 67 sec. V/C = 0.94)	City of Antioch General Plan
Signalized intersections on Basic Routes in Antioch, further than 1,000 feet of a freeway interchange • East 18th Street/Hillcrest Avenue (#6) • East 18th Street/Viera Avenue (#7)	High-LOS D (Avg Delay = 50 sec. V/C = 0.85-0.89)	City of Antioch General Plan
Unsignalized intersections on Basic Routes in Antioch, within 1,000 feet of a freeway interchange • Wilbur Ave/SR 160 Southbound Ramps (#3) • Wilbur Ave/SR 160 Northbound Ramps (#4)	Mid-LOS E (Delay = 41 sec)	Note: Unsignalized intersections are not explicitly addressed in the Antioch General Plan, so this threshold is extrapolated from the standard for signalized intersections.
Unsignalized intersections on Basic Routes in Antioch, further than 1,000 feet of a freeway interchange • Wilbur Avenue/Minaker Drive (#1) • Wilbur Avenue/Viera Avenue (#2) • East 18th Avenue/Phillips Lane (#8)	High-LOS D (Delay = 32 sec)	Note: Unsignalized intersections are not explicitly addressed in the Antioch General Plan, so this threshold is extrapolated from the standard for signalized intersections.

Source: CCTA, City of Oakley, and City of Antioch, 2006.

2. SETTING

This chapter describes the transportation system in project study area, including the surrounding roadway network, as well as transit, pedestrian, and bicycle facilities in the vicinity of the project site.

STUDY AREA ROADWAYS

The project site is a triangular area bounded on the north by the Burlington Northern-Santa Fe (BNSF) Railroad tracks, on the south by Main Street (SR 4), and on the west by Bridgehead Road. Major roadways in the study area include SR 160, Main Street, Neroly Road/Bridgehead Road, Oakley Road, Empire Avenue, Laurel Road, Hillcrest Avenue, and East 18th Street. Other minor roadways include Sandy Lane, Live Oak Avenue, Big Break Road, Wilbur Avenue, and West Cypress Road. Each of these roadways is described below.

SR 160 is a north-south highway that extends through the study area, west of the project site. This roadway serves as a major route connecting Oakley to the Antioch Bridge and Sacramento County to the north, and to the SR 4 freeway to the west. SR 160 typically has two lanes in each direction, narrowing to one lane per direction north of the Antioch Bridge toll plaza.

Main Street (SR 4) is an east-west arterial extending from an interchange with SR 160 on the west to Brentwood and Stockton on the southeast. In the vicinity of the project, Main Street typically provides two lanes in each direction with a two-way center left-turn lane. Primary access to the project site would be provided from Main Street.

Neroly Road/Bridgehead Road is a two-lane north-south roadway connecting Oakley to Brentwood and borders the west side of the project site. Site access would be provided from Bridgehead Road.

Oakley Road is a two-lane east-west minor arterial that connects Oakley to Antioch. It extends from west of SR 160 in Antioch eastward to its terminus at Empire Avenue.

Empire Avenue is a major north-south roadway in the study area, providing connections between Brentwood and Oakley. In the study area, Empire Avenue is typically a four-lane road.

Wilbur Avenue is an east-west roadway to the north of the project site, with an interchange on SR 160. Wilbur Avenue provides access to industrial and residential areas and extends westward into Antioch.

Sandy Lane is a minor north-south roadway between Main Street and Oakley Road that primarily serves local residents. It is unpaved, except where it intersects Main Street. Access to the project site is proposed as the north leg of the Sandy Lane/Main Street intersection.

Live Oak Avenue is a two-lane roadway extending from Main Street in the north to Neroly Road in the south. An extension of Live Oak Avenue as a major arterial is anticipated to be constructed by 2030 through the project site and into proposed industrial areas to the north with a grade-separated crossing at the railroad tracks. Project site access would be provided on the Live Oak Avenue extension.

Big Break Road is a minor north-south roadway providing access to a large residential development and the Oakley Marina. There is an at-grade railroad crossing just north of Main Street at the BNSF tracks.

Hillcrest Avenue is a two- to six-lane, north-south roadway located west of the project site. In the project area, Hillcrest Avenue is mostly a residential street with no pedestrian or bicycle facilities.

Laurel Road is a major east-west roadway in the City of Oakley. This roadway, which extends from Neroly Road to east of Main Street (SR 4) currently has two to four travel lanes. Laurel Road connects to Empire Avenue and O'Hara Avenue in the study area. In the future the roadway will be extended to provide access to SR 4 Bypass and Hillcrest Avenue.

Cypress Road is a two- to four-lane east-west arterial that begins at Empire Avenue and continues east of Main Street (SR 4). In the project area, Cypress Road is residential.

East 18th Street is a major east-west arterial in Antioch and is located north of SR 4 and runs parallel to SR 4. The street also provides direct access to SR 4 and SR 160. East of SR 4/SR 160, East 18th Street becomes Main Street. In the project area East 18th Street has between two and four lanes.

BICYCLE AND PEDESTRIAN FACILITIES

Currently, limited bicycle and pedestrian facilities exist within the project study area. In the vicinity of the project, bicycle lanes exist on Empire Avenue and portions of Vintage Parkway. The City of Oakley General Plan (adopted in December 2002), the City of Antioch General Plan (November 2003), City of Oakley Parks, Recreation and Trails Master Plan (March 2003), and East County Bikeway Plan (November 2001) propose that several new facilities be constructed in the future. Bike lanes are planned for Main Street, Big Break Road, Oakley Road, Wilbur Avenue, Laurel Road, Viera Avenue, Neroly Road, and O'Hara Avenue.

Sidewalks, which occur intermittently throughout the project study area, are provided on segments of Main Street at the SR 160 Southbound Ramps as well as on Bridgehead Road/Neroly Road, Big Break Road, and portions of East 18th Street east of Viera Street. However, no contiguous sidewalk facilities exist in the project area.

Local multi-use trails are proposed along the railroad right-of-way to the north of the project site and along Neroly Road/Bridgehead Road and Live Oak Avenue. A network of regional trails, which would be maintained by the East Bay Regional Parks District, is proposed in the vicinity of Big Break Road and along the water frontage.

TRANSIT SERVICE

Tri-Delta Transit currently operates four local bus routes and two express commuter routes in the project area, as described below.[1]

Route 300, the Pittsburg BART/Brentwood Park & Ride route, is a weekday express route connecting Brentwood to the Pittsburg/Bay Point BART station via Oakley and Antioch. The bus travels along Main Street with the closest stops to the study area located near the Main Street/Big Break Road and Main Street/Empire Avenue intersections. The bus operates from 4:15 AM to approximately 10:00 PM on 15- to 30-minute headways.

Route 383, the Oakley/Antioch/Freedom High School route, connects Oakley to Antioch and Freedom High School in Oakley. Stops are provided at three locations along Main Street in the vicinity of the proposed project, at SR 160 Southbound Ramps, Bridgehead Road, and Big Break Road. This route is only in service on weekdays and provides both clockwise and counterclockwise routes. The counterclockwise route runs at approximately one-hour headways. The clockwise route runs twice during the AM peak hour period only.

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[1] Based on schedules posted on the Tri-Delta Transit website (www.trideltatransit.com), as of November 2006.

Route 391, the BART/Pittsburg/Antioch/Oakley/Brentwood route, provides weekday service to most East County cities. In the study area, stops are provided along Main Street at the SR 160 Southbound Ramps, Bridgehead Road, and Big Break Road. The route operates from 4:00 AM to 1:15 AM on 30- to 60-minute headways.

Route 392, the BART/Pittsburg/Antioch/Oakley/Brentwood route, is the weekend service of Route 391. The route operates from 5:20 AM to 1:00 AM on 60-minute headways.

Delta Express, the express commuter bus run by Tri-Delta Transit, has two routes with stops in Oakley. One route connects Oakley with the Dublin/Pleasanton BART station, where passengers can connect with a free shuttle to the Bishop Ranch Business Park. Passengers can board the bus at the Oakley Albertsons (located in the shopping center on the southeast corner of the Empire Avenue/Main Street intersection) at 4:55 AM and 5:25 AM, and can board for return service at 4:34 PM and 5:49 PM. Another route, which connects to Lawrence Livermore National Lab, departs from Oakley Albertsons at 5:18 AM and 6:14 AM and return trips depart from the East Gate at 4:14 PM and 5:14 PM.

EXISTING TRAFFIC CONDITIONS

Existing traffic conditions at most of the study intersections were based on morning (7:00 AM to 9:00 AM) and evening (4:00 PM to 6:00 PM) peak period intersection turning movement counts conducted in October 2003, May 2004, July 2004, October 2004, and August 2006. The counts were conducted on clear days with area schools in normal session. The existing peak period traffic counts are provided in Appendix A. For each intersection count period, a universal peak hour period of 7:00 AM to 8:00 AM and 4:45 PM to 5:45 PM were used. Since intersection counts were collected at different dates, they were also adjusted to present consistent baseline conditions. These volumes are shown on Figure 3. The peak hour data is used as the basis for the analysis. Peak hour volumes between study intersections may not balance because of the numerous driveways and access points that exist between study intersections. The existing intersection lane configurations and traffic controls are shown on Figure 4.

Intersection operations were evaluated for the weekday AM and PM peak hours at the 23 existing study intersections. The Neroly Road/Live Oak Avenue and Laurel Road/Live Oak Avenue intersections (Intersections # 23 and 24, respectively) are not evaluated under existing conditions since the future redesign of these intersections corresponding with the opening of the SR 4 Bypass will significantly alter traffic patterns and counts. Table 4 summarizes the analysis results using both CCTALOS and HCM. The detailed intersection LOS calculation worksheets are presented in Appendix B.

As shown in Table 4, all signalized study intersections operate at acceptable levels of service based on the CCTALOS and HCM methods and LOS thresholds, with the exception of the Main Street/Bridgehead Road/ Neroly Road intersection which operates at LOS E in the PM peak period.

Most unsignalized intersections operate at an acceptable level of service during both the AM and PM peak hours, with the exception of Main Street/Live Oak Avenue (AM and PM peak hours), Oakley Road/Neroly Road (PM peak hour), and Laurel Road/Empire Avenue (PM peak hour). The Live Oak Avenue approach at the Main Street/ Live Oak Avenue intersection operates at LOS F during the AM and PM peak hours. This is because Live Oak Avenue traffic is under stop-control and must yield to all Main Street traffic. Despite poor operations on the side-street, the overall intersection operates at LOS A. The City of Oakley is currently in the process of signalizing this intersection (Intersection #13). The Oakley Road/Neroly Road and Laurel Road/Empire Avenue intersections are all-way stop-controlled intersections and operate at LOS E in the PM peak hour period. At the Oakley Road/Neroly Road intersection, the unacceptable service level is caused by heavy southbound (Neroly Road) traffic volumes; at the /Laurel Road/Empire Avenue intersection, heavy northbound and southbound volumes (Empire Avenue) cause the unacceptable conditions. None of the three intersections currently operating at unacceptable levels have traffic volumes that satisfy MUTCD peak hour signal warrants.

TABLE 4
EXISTING CONDITIONS
INTERSECTION PEAK HOUR LOS SUMMARY

Intersection	Control[1]	Peak Hour	CCTALOS		HCM	
			V/C Ratio[2]	LOS	Delay[3]	LOS
1. Wilbur Avenue/Minaker Drive	SSSC	AM PM	-- --	-- --	3 (14) 3 (17)	A (B) A (C)
2. Wilbur Avenue/Viera Avenue	SSSC	AM PM	-- --	-- --	1 (14) 1 (13)	A (B) A (B)
3. Wilbur Avenue/SR 160 SB Ramps	SSSC	AM PM	-- --	-- --	3 (12) 5 (23)	A (B) A (C)
4. Wilbur Avenue/SR 160 NB Ramps	SSSC	AM PM	-- --	-- --	1 (11) 2 (15)	A (B) A (C)
5. Wilbur Avenue/Bridgehead Road	AWSC	AM PM	-- --	-- --	16 13	C B
6. East 18th Street/Hillcrest Avenue	Signal	AM PM	0.30 0.62	A B	20 25	B C
7. East 18th Street/Viera Avenue	Signal	AM PM	0.44 0.34	A A	10 6	A A
8. East 18th Avenue/Phillips Lane	SSSC	AM PM	-- --	-- --	1 (10) 0 (11)	A (B) A (B)
9. Main Street/SR 160 SB Ramps	Signal	AM PM	0.45 0.52	A A	12 15	B B
10. Main Street/SR 160 NB Ramps	Signal	AM PM	0.61 0.83	B D	16 52	B D
11. Main Street/Bridgehead Road/Neroly Road	Signal	AM PM	0.57 **0.94**	A **E**	32 **70**	C **E**
12. Main Street/Sandy Lane	SSSC	AM PM	-- --	-- --	0 (23) 0 (12)	A (C) A (B)
13. Main Street/Live Oak Avenue	SSSC[6]	AM PM	-- --	-- --	1 (29) **5 (>50)**	A (D) **A (F)**
14. Main Street/Big Break Road	Signal	AM PM	0.49 0.55	A A	12 20	B B
15. Oakley Road/Neroly Road	AWSC	AM PM	-- --	-- --	13 **36**	B **E**
16. Oakley Road/Live Oak Avenue	AWSC	AM PM	-- --	-- --	8 10	A A
17. Oakley Road/Empire Avenue	Signal	AM PM	0.27 0.49	A A	16 23	B C
18. Main Street/Empire Avenue	Signal	AM PM	0.38 0.51	A A	19 22	B C

TABLE 4
EXISTING CONDITIONS
INTERSECTION PEAK HOUR LOS SUMMARY

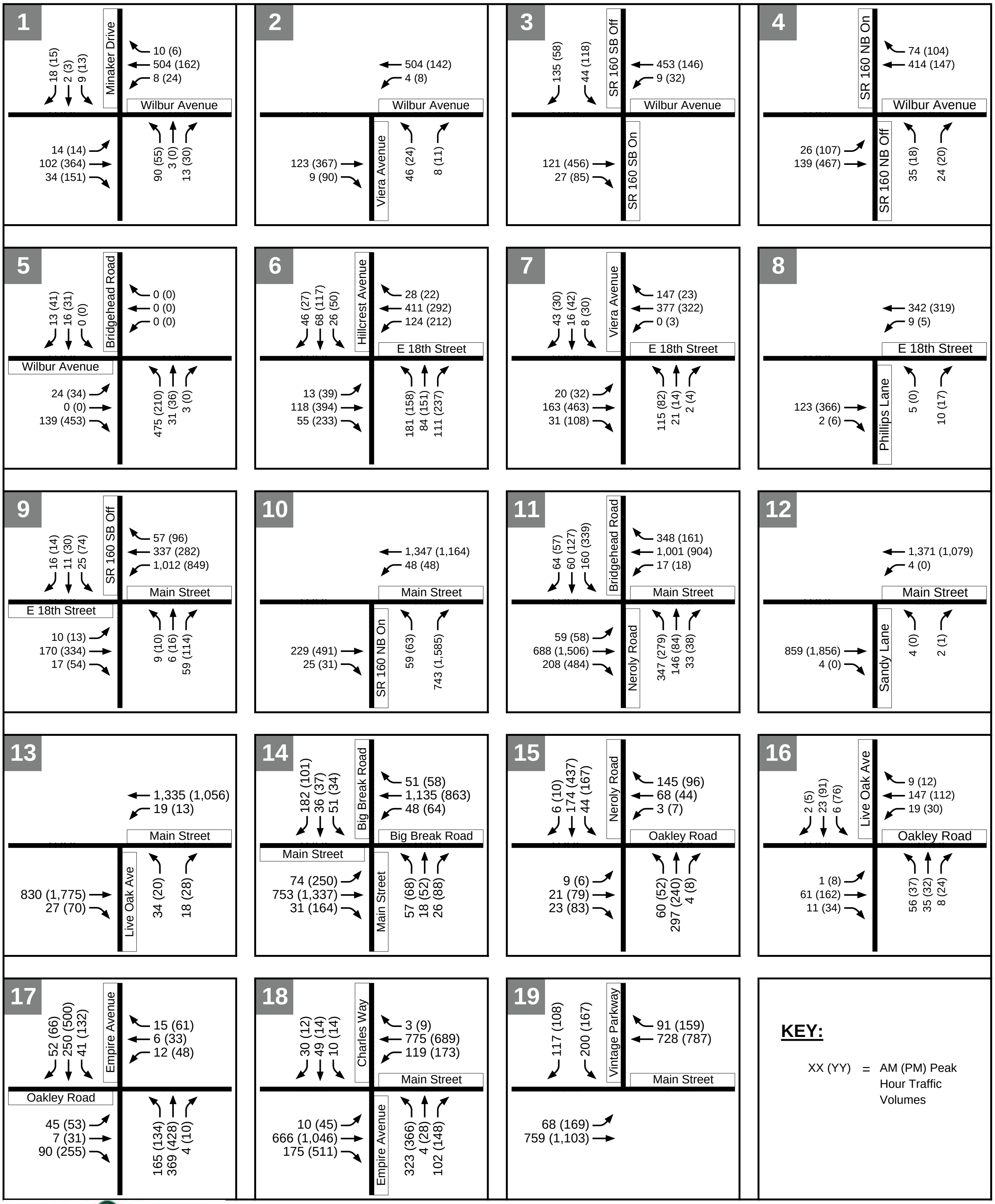
Intersection	Control[1]	Peak Hour	CCTALOS		HCM	
			V/C Ratio[2]	LOS	Delay[3]	LOS
19. Main Street/Vintage Parkway	Signal	AM	0.39	A	10	B
		PM	0.47	A	11	B
20. Main Street/O'Hara Avenue[4]	Signal	AM	0.57	A	9	A
		PM	0.68	B	11	B
21. Cypress Road/Empire Avenue[4]	Signal	AM	0.23	A	9	A
		PM	0.27	A	10	B
22. Cypress Road/Main Street	Signal	AM	0.43	A	22	C
		PM	0.45	A	23	C
23. Neroly Road/Live Oak Avenue[5]	N/A	AM	N/A	N/A	N/A	N/A
		PM	N/A	N/A	N/A	N/A
24. Laurel Road/Live Oak Avenue[5]	N/A	AM	N/A	N/A	N/A	N/A
		PM	N/A	N/A	N/A	N/A
25. Laurel Road/Empire Avenue	AWSC	AM	--	--	19	C
		PM	--	--	**46**	**E**

Bold indicates intersection operating at deficient level of service.

1. Signal = Signalized intersection
   SSSC = Side-street stop-controlled intersection
   AWSC = All-way stop-controlled intersection
2. Volume-to-capacity ratio (V/C) determined for all signalized intersections using the CCTALOS methodology.
3. Average intersection delay is calculated for all signalized and unsignalized intersections using the 2000 *Highway Capacity Manual* (HCM) methods. For side-street stop-controlled intersections, average intersection delay (in seconds per vehicle) is presented. Delay for worst approach is shown in parentheses.
4. Intersections were unsignalized when traffic counts were conducted, but have been signalized since. They have been analyzed as signalized intersections.
5. Intersection will be analyzed under future scenarios.
6. Intersection currently in the process of being signalized by the City of Oakley.

Source: Fehr & Peers, 2006.

The CCTALOS method can produce different results than the HCM method. The primary reason that the methods produce different results is that the CCTALOS method analyzes each intersection independently as an isolated intersection and calculates level of service based on the theoretical capacity of each movement at the intersection. Level of service in the HCM method is based on the delay experienced by each vehicle. The HCM method calculates delay based on physical characteristics of the intersection including signal timing and phasing at the intersection.



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EXISTING
PEAK HOUR INTERSECTION VOLUMES

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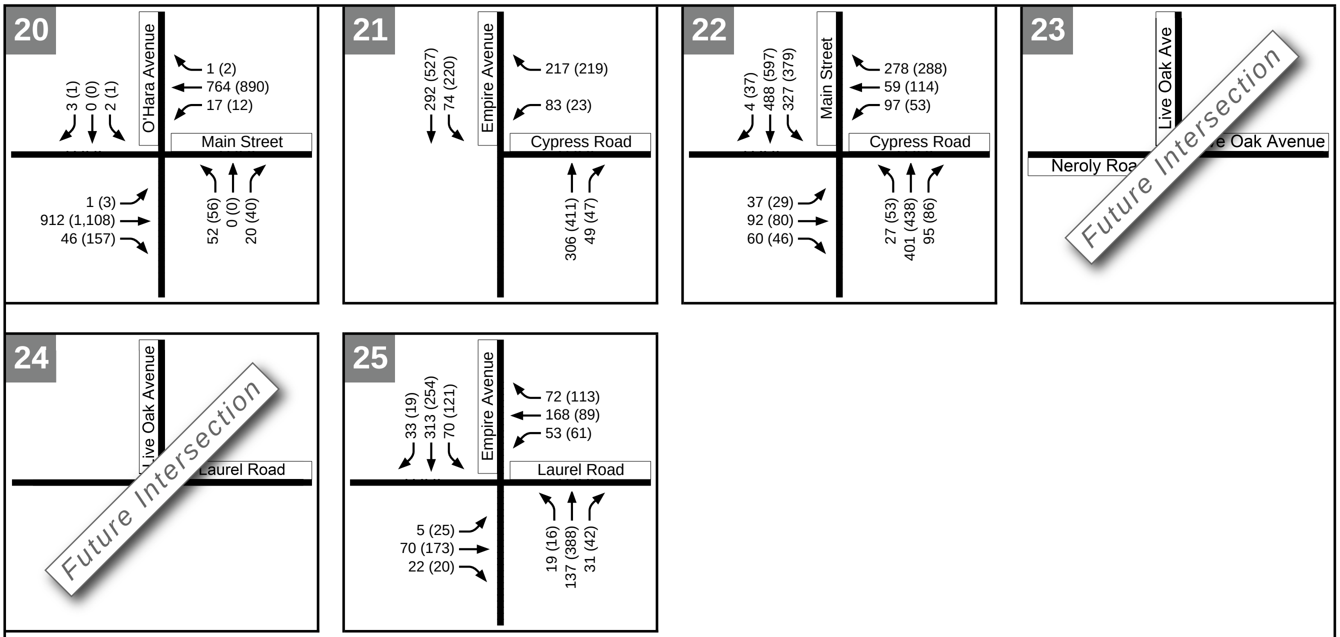
Figure 3A



KEY:

XX (YY) = AM (PM) Peak Hour Traffic Volumes

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EXISTING
PEAK HOUR INTERSECTION VOLUMES

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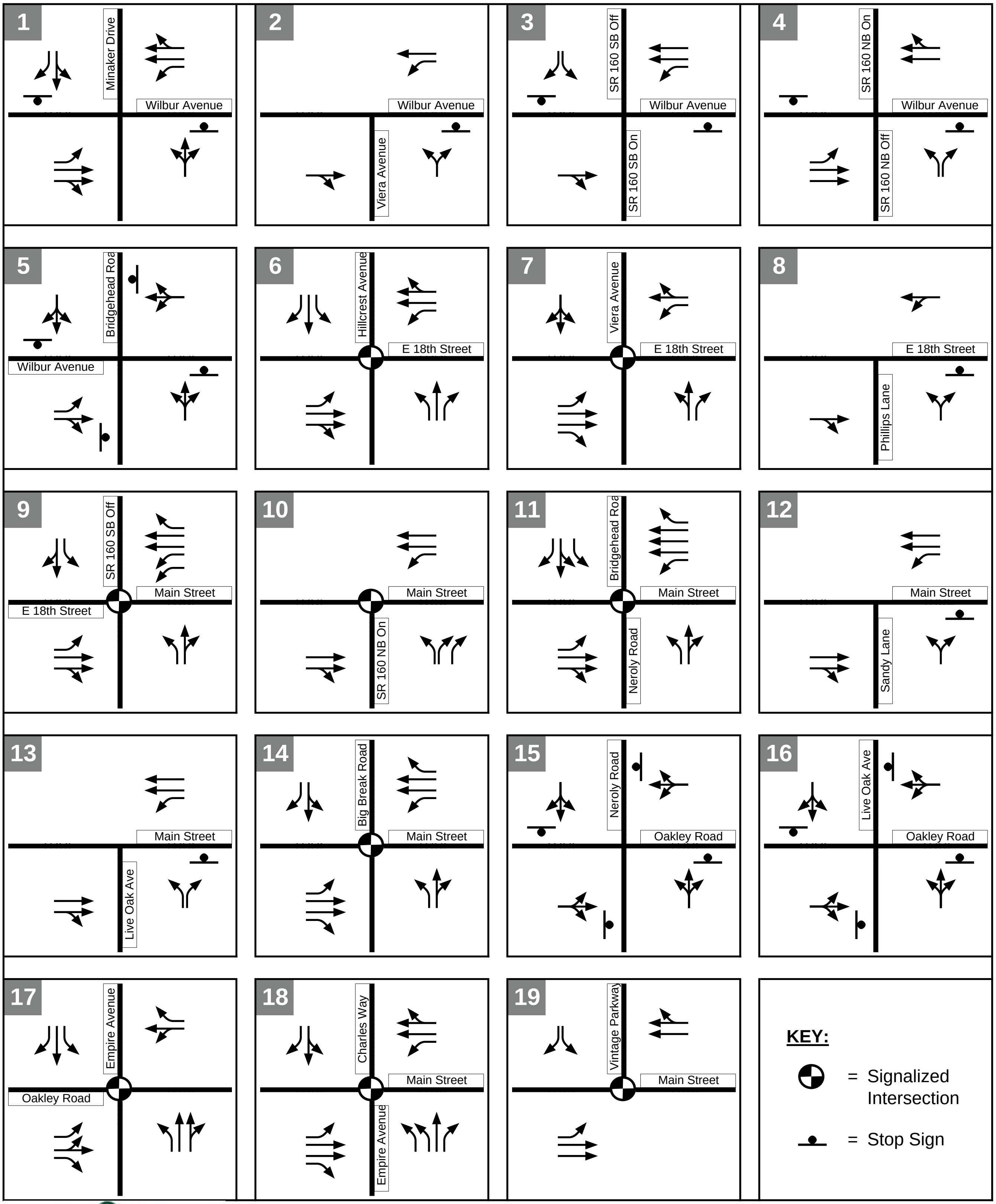
Figure 3B



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EXISTING
INTERSECTION LANE CONFIGURATIONS & TRAFFIC CONTROL

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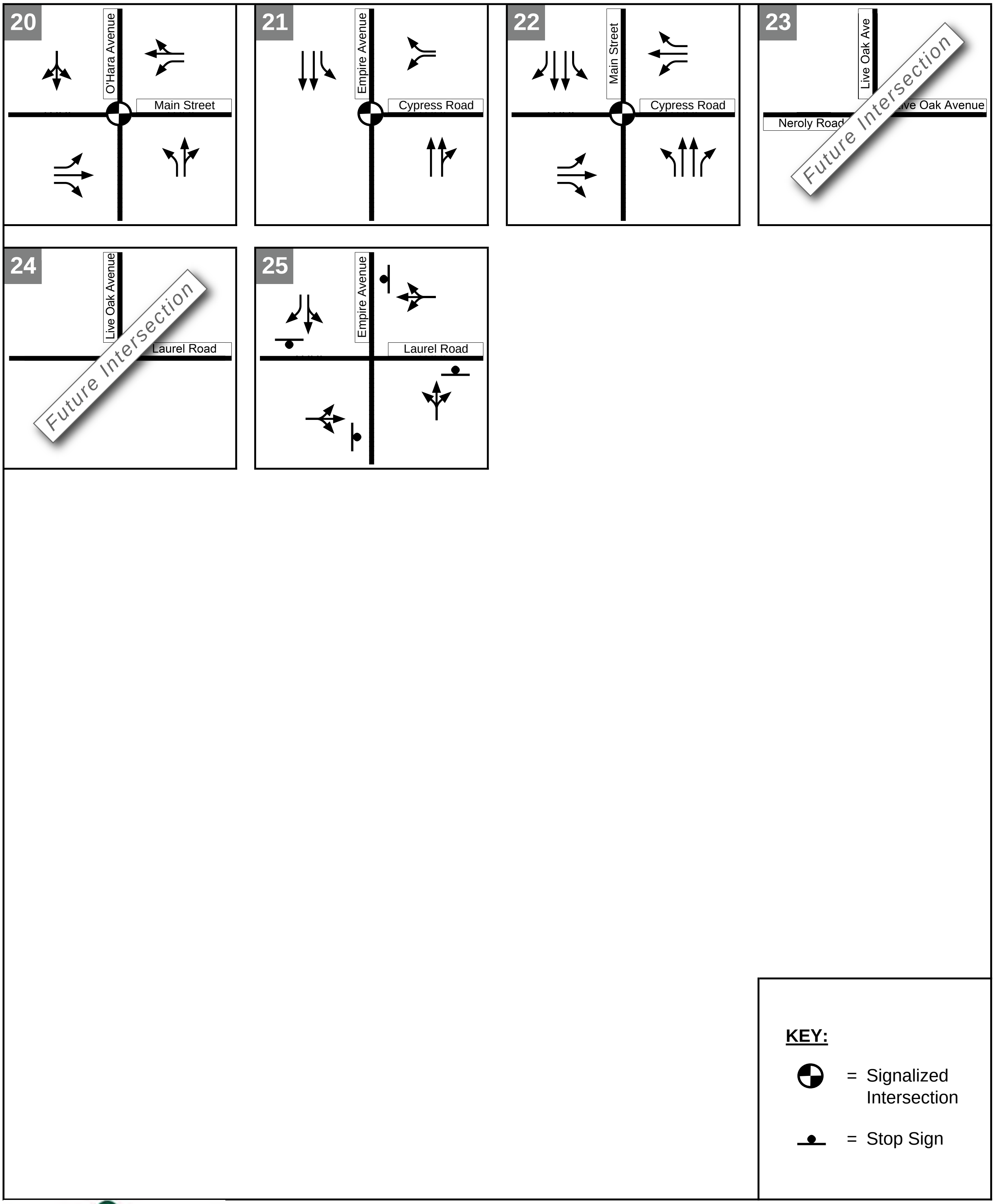
Figure 4A



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EXISTING
LANE CONFIGURATION AND TRAFFIC CONTROL

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Figure 4B

EXISTING FREEWAY OPERATIONS

Existing freeway operations were evaluated for the weekday AM and PM peak hours using the Delay Index method described earlier. Traffic operations along county freeways are periodically monitored and reported by CCTA as part of its Congestion Management Program (CMP). The most recent monitoring is documented in *Traffic Service Objective Monitoring Report* (CCTA, 2004). As shown in Table 5, the only freeway segment in the study area, SR 4 between Hillcrest Avenue and Main Street, currently satisfies the TSO during both AM and PM peak hours.

TABLE 5
EXISTING CONDITIONS
FREEWAY DELAY INDEX SUMMARY

Freeway Segment	Peak Hour	TSO[1]	Delay Index[2]	
			Eastbound	Westbound
SR 4 between Hillcrest Avenue and Antioch Bridge Toll Plaza	AM PM	2.5 2.5	N/A 1.1	1.1 N/A

Results in **bold** represent freeway segments exceeding established TSO
N/A = delay index not reported by CCTA.
1. Travel Service Objective as established by CCTA
2. Delay index as documented in Traffic Service Objective Monitoring Report (CCTA, 2004)

Source: Fehr & Peers, 2006.

3. PROJECT CHARACTERISTICS

This chapter presents the methods used to estimate project-generated traffic and describes project trip generation, distribution, and assignment characteristics.

PROJECT DESCRIPTION

The project site is bounded by Main Street (SR 4) to the south, Bridgehead Road to the west, and the BNSF railroad tracks to the north. The project site is currently vacant and the proposed development would consist of commercial space of up to 770,000 square-feet, which would include three major retail sites and various smaller pads:

- A 231,000 square-foot discount supercenter providing sales of garden, tire, groceries, and other merchandise (Pad B)
- A 167,000 square-foot home-improvement superstore (Pad C)
- A 100,000 square-foot discount store (Pad A)
- An additional 242,000 square-feet of general retail use
- A 30,000 square-foot hotel providing up to 75 rooms (Pad S)

The project site would be accessible from Bridgehead Road and Main Street. A signal-controlled full access point is proposed on Bridgehead Road. Four direct signalized access points are proposed along Main Street; opposite Sandy Lane, between Sandy Lane and Live Oak Avenue, at the Main Street/Live Oak Avenue intersection, and at the east end of the site.

VEHICLE TRIP GENERATION ASSUMPTIONS

Project vehicle trip generation was estimated using appropriate trip generation rates and equations for the proposed land uses from Institute of Transportation Engineer's (ITE) *Trip Generation* (7th Edition) and available site specific data, as shown in Table 6. Vehicle trip generation was derived by applying the appropriate ITE trip generation rate or equation to the proposed project components. Trip generation for the proposed development is shown in Table 7.

Discount Superstore Trip Generation

Trip generation for the discount superstore is based on *Trip Generation Characteristics of Free-Standing Discount Superstores*, (VRPA Technologies Inc., *ITE Journal*, August 2006). That study presented a PM peak-hour rate developed from recent (2003) surveys of superstores that are close in size to the typical superstore constructed today (200,000+ square feet). The derived PM peak hour trip rate from this report is based on studies at five supercenters in Texas and Oklahoma. By contrast, ITE rates for land use category 813 (Free-Standing Discount Superstore), derived from ten observations, may be inaccurate for analyzing these categories of retail stores because:

- The stores included in the ITE study averaged 154,000 square feet when they were surveyed in the 1990s, significantly smaller than the average supercenter size today

- Sales have increased at discount superstores over the past decade which has likely led to higher traffic volumes

The VRPA study determined that the trip generation rate for discount superstores is significantly higher than that reported by ITE. Although ITE *Trip Generation* is an accepted industry standard, the *Trip Generation Handbook, 2nd Edition* (ITE, June 2004) recommends using supplemental information and site-specific studies where possible. Therefore the VRPA study rate is used for the PM peak hour in this study to present a conservative analysis. The AM peak hour and Daily trip generation rates have been derived by applying the percent increase in the VRPA PM rate over the ITE rate to the AM and Daily ITE calculations.

TABLE 6
TRIP GENERATION RATES AND EQUATIONS FOR PROJECT LAND USES

Proposed Land Use	ITE Code	AM Peak Hour	PM Peak Hour	Daily
Shopping Center	820	T = 1.03(X)	Ln(T) = 0.66*Ln(X)+3.40	Ln(T) = 0.65*Ln(X)+5.83
Home Improvement Superstore	862	T = 1.20(X)	T = 2.45(X)	T = 29.80(X)
Discount Superstore[1]	Other Studies/813	T = 2.76(X)	T = 5.80(X)	T = 73.75(X)
Discount Store	815	T = 0.84(X)	T = 5.06(X)	T = 56.02(X)
Hotel	310	Ln(T) = 1.24*Ln(X)–2.00	T = 0.59(X)	T = 8.95(X)–373.16

Source: Trip Generation (7th Edition), Institute of Transportation Engineers, March 2001

Notes: T = Number of Trips, LN = Natural Logarithm, X = 1,000 square feet of development (retail), or number of rooms (hotel).

1. Trip generation for Discount Superstore is based on *Trip Generation Characteristics of Free-Standing Discount Superstores* (VRPA Technologies Inc., *ITE Journal*, August 2006). This rate is higher than the free-standing discount superstore average rate provided by the Institute of Transportation Engineers (ITE) Trip Generation 7th Edition (March 2003), and therefore represents a conservative scenario.

Fehr & Peers, 2006.

Pass-by Trips

A pass-by trip is defined as a trip already on the surrounding roadway system that would divert to the proposed project as an interim stop to an ultimate destination. Pass-by trips are not considered new trips on the surrounding roadway system, but do represent new trips to and from the project site. Pass-by rates are generally very high for convenience destinations, such as fast-food restaurants and gas stations, and lower for traditional commercial establishments. To account for trips on the roadway that would divert from their current path as a result of the shopping center, a pass-by trip reduction was used based on the methodology described in ITE's *Trip Generation Handbook* for the commercial land uses in the Cline Specific Plan. Based on the method in *Trip Generation Handbook*, the average pass-by rate for the commercial uses is as follows:

- Shopping Center: 34%
- Discount Store: 17% (rate also applied to superstore)

Pass-by trip rates are typically applied only to the PM peak hour trip results. Trip generation rates were not discounted for the home improvement superstore and hotel.

PROJECT TRIP GENERATION

As shown in Table 7, the proposed project would generate about 32,000 new daily trips, 1,200 new morning peak hour trips, and 2,700 new evening peak hour trips. Please note that trip generation estimates do not account for the potential effects of trip internalization (i.e., the likelihood that some visitors to the site will shop at more than one establishment during a single visit). Thus the following trip generation calculations represent a conservative estimate of the site's travel characteristics.

TABLE 7
PROJECT TRIP GENERATION

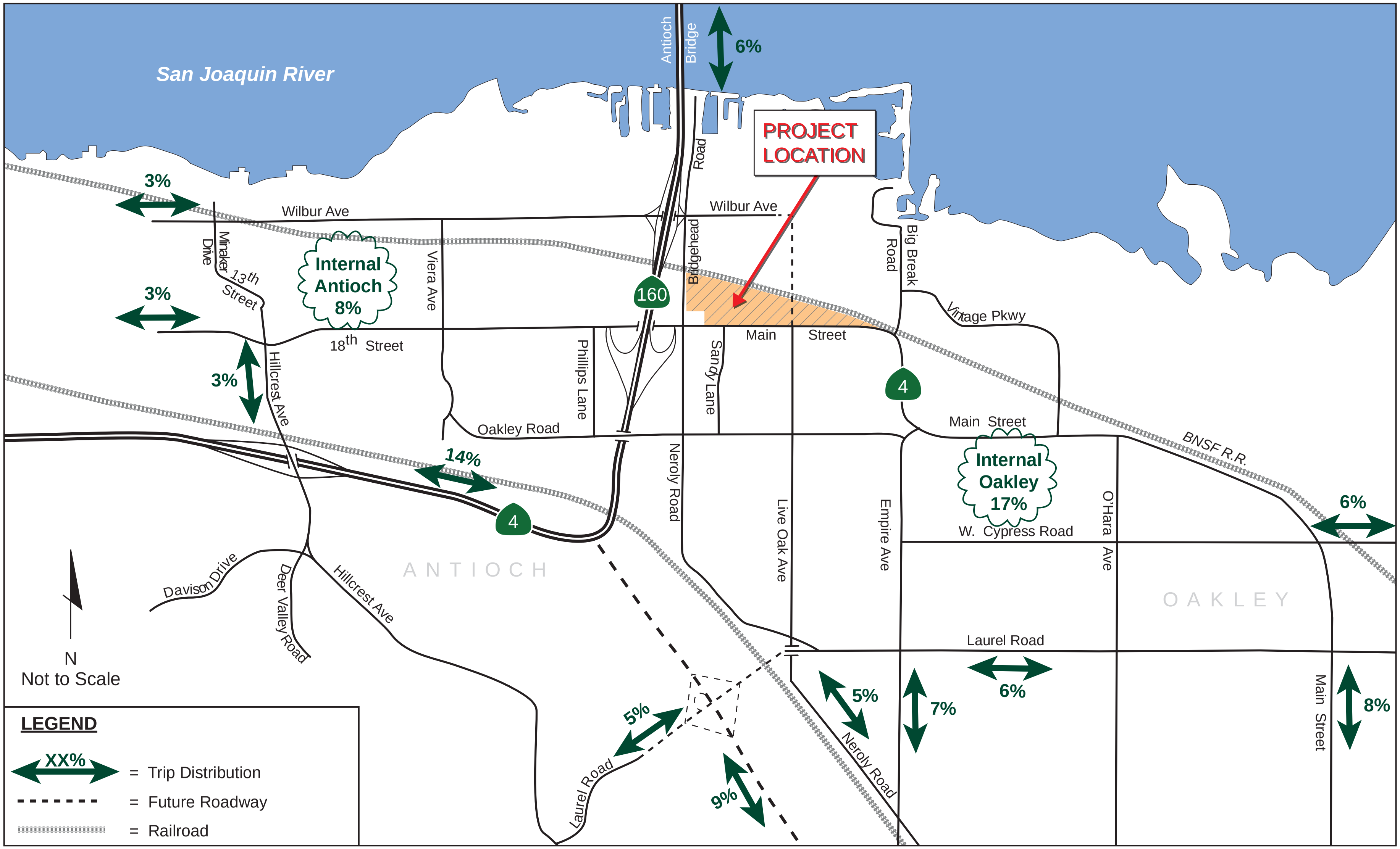
Land Use	**Size**	**Daily Trips**	**AM Peak Hour Trips In**	**AM Peak Hour Trips Out**	**AM Peak Hour Trips Total**	**PM Peak Hour Trips In**	**PM Peak Hour Trips Out**	**PM Peak Hour Trips Total**
Retail	242 ksf	12,060	152	97	249	539	583	1,122
Pass-by Trips (34%)		*-4,100*	*0*	*0*	*0*	*-191*	*-191*	*-382*
Discount Superstore	231 ksf	17,040	325	312	637	697	643	1,340
Pass-by Trips (17%)		*-2,900*	*0*	*0*	*0*	*-114*	*-114*	*-228*
Discount Store	100 ksf	5,600	57	27	84	253	253	506
Pass-by Trips (17%)		*-950*	*0*	*0*	*0*	*-43*	*-43*	*-86*
Home Improvement Superstore	167 ksf	4,980	108	92	200	192	217	409
Pass-by Trips (0%)		*0*	*0*	*0*	*0*	*0*	*0*	*0*
Hotel	75 rooms	300	18	11	29	23	21	44
Pass-by Trips (0%)		*0*	*0*	*0*	*0*	*0*	*0*	*0*
TOTAL PROJECT TRIPS		***39,980***	***660***	***539***	***1,199***	***1,704***	***1,717***	***3,421***
TOTAL PASS-BY TRIPS		***-7,950***	***0***	***0***	***0***	***-348***	***-348***	***-696***
TOTAL NET NEW TRIPS		***32,030***	***660***	***539***	***1,199***	***1,356***	***1,369***	***2,725***

Notes: ksf = 1,000 square feet of development
Source: Fehr & Peers, 2006.

TRIP DISTRIBUTION AND ASSIGNMENT

Project trips have been distributed onto the roadway system to and from the site considering the location and density of residential and other commercial developments within the City of Oakley and in the vicinity, as well as the major travel routes that serve the project area. The project trip distribution percentages are shown on Figure 5.

Trips generated by the proposed project were assigned to the roadway system based on the directions of approach and departure as described above. The AM and PM peak hour project trip assignments are shown on Figure 6.



LEGEND

XX% = Trip Distribution

- - - - - - = Future Roadway

▨ = Railroad

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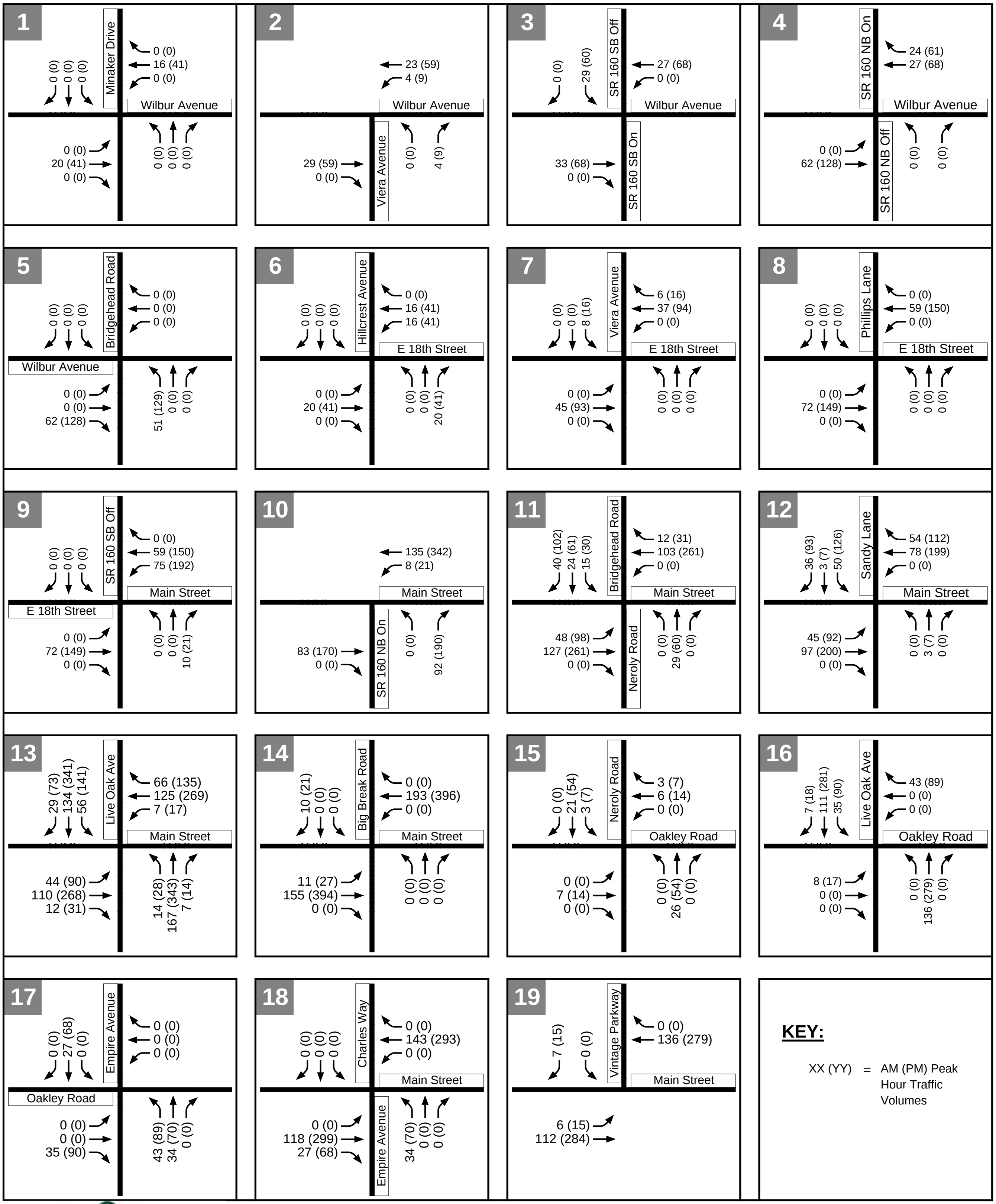
PROJECT TRIP DISTRIBUTION

Figure 5



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PROJECT TRIP ASSIGNMENT

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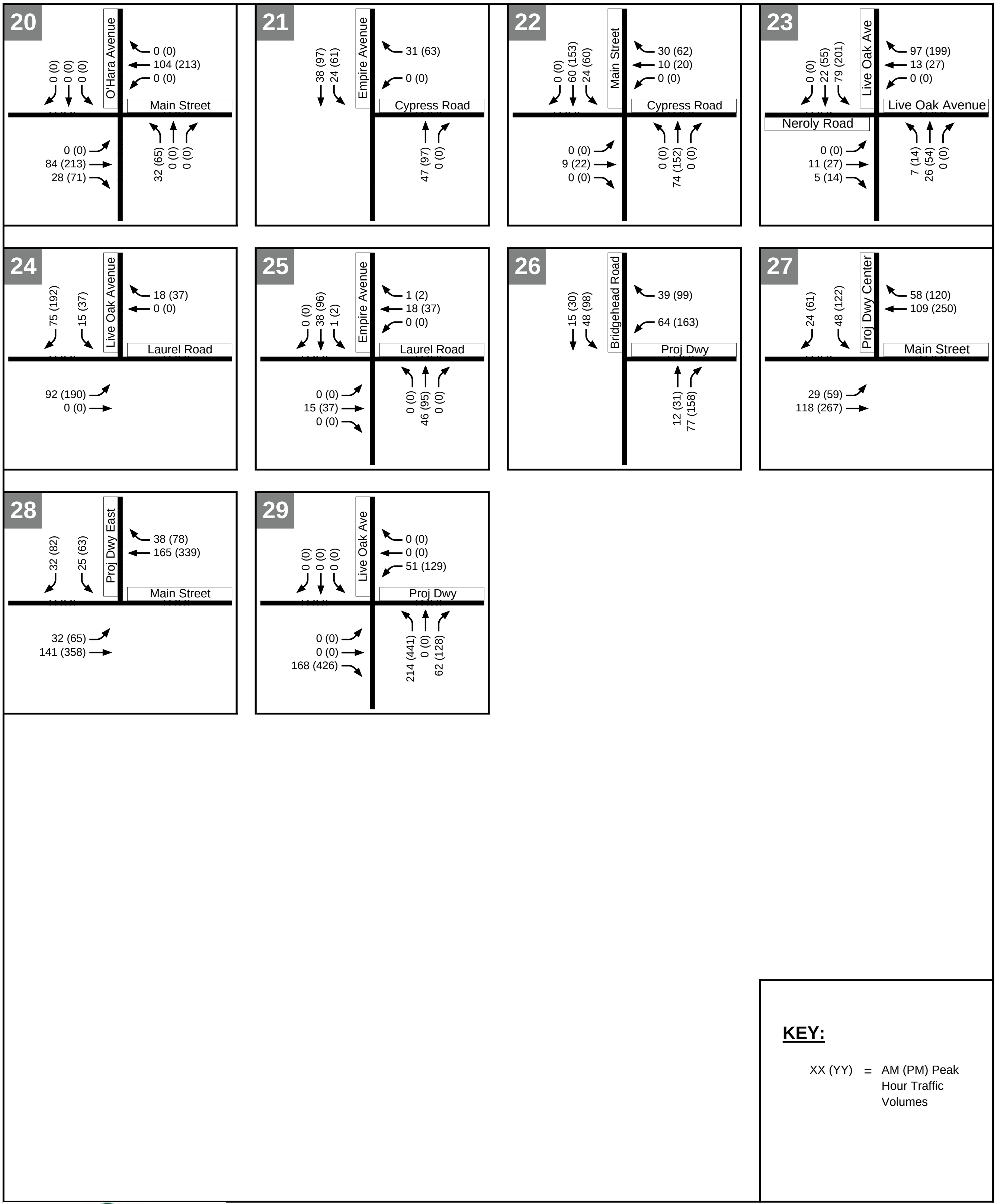
Figure 6A



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PROJECT TRIP ASSIGNMENT

Figure 6B

4. NEAR TERM TRAFFIC CONDITIONS

This chapter discusses Near Term (approximately corresponding to year 2010) traffic conditions based on existing conditions and traffic from approved developments within the City of Oakley, both without and with the project.

NEAR TERM ROADWAY IMPROVEMENTS

Significant roadway network changes are expected in the study area in the near future. Funded roadway improvements planned for the next few years were assumed to be completed for the Near Term conditions analysis. Major roadway improvements assumed to be completed for this analysis include:

- Completion of segment 1 of the SR 4 Bypass as a four-lane freeway between the current SR 4 freeway and Lone Tree Way with full interchanges at Laurel Road and Lone Tree Way, and a partial interchange at the existing SR 4 freeway with no ramps between SR 160 and the SR 4 Bypass (Under construction)
- Extension of Laurel Road westbound between Empire Avenue into the City of Antioch and reconfiguration of Neroly Road/Live Oak Avenue, Laurel Road/Live Oak Avenue, and Laurel Road/Empire Avenue intersections (Under construction)
- Widening of the East Cypress Road/Main Street intersection (Under construction)
- Signalization of the Main Street/Live Oak Avenue intersection
- Widening of East 18th Street to four lanes between Willow Avenue and SR 4
- Addition of a northern leg and signalization of the East 18th Street/Phillips Lane intersection
- Signalization of the Wilbur Avenue/Minaker Drive intersection
- Addition of a second left turn lane on northbound Neroly Road at the Main Street/Bridgehead Road/Neroly Road intersection

Figure 7 shows expected lane configurations and traffic controls at the study intersections under the Near Term (2010) scenario.

NEAR TERM TRAFFIC FORECASTS

Traffic volumes for this scenario include existing traffic counts and traffic from approved development in the vicinity of the project site. These conditions represent the likely traffic levels with the opening of the project in the next few years. Considering the major changes in the regional roadway network and the amount of regional growth expected in the next few years, the Contra Costa Transportation Authority (CCTA) Decennial Countywide Travel Demand Model was selected as the most appropriate tool to forecast Near Term (2010) No Project AM and PM peak hour intersection volumes. The CCTA model was executed for years 2005 and 2010 and the results were used to develop intersection turning movement volumes through the "Furnessing" technique as described in CCTA's *Technical Procedures* (June 2006). "Furnessing" is an iterative process which develops future turning movement volumes by applying the difference between the base model volumes and the existing intersection counts to future model approach and departure volumes.

Year 2005 Travel Demand Model

The travel demand model as developed by CCTA provides forecasts for the years 2000, 2010, 2020 and 2030. A year 2005 model was developed for this analysis to provide a better reflection of existing baseline conditions. The major inputs into the travel demand model are roadway network and land use databases. The roadway network for the 2005 scenario was based on the 2000 roadway network and modified to include roadway network improvements within the City of Oakley and surrounding areas that have been implemented since year 2000. The land use input for the 2005 scenario was developed by interpolating between the model land uses for years 2000 and 2010. The 2005 land use files were further refined to reflect specific development projects that were constructed between 2000 and 2005.

A sub-area model validation exercise was conducted, in which the forecasted 2005 AM and PM peak hour volumes produced by the model were compared with intersection counts collected in Oakley and northeast Antioch between 2004 and 2006. The model input parameters were further adjusted to better validate the baseline 2005 model. Appendix C shows the results of the validation test for the study area based on the model validation criteria developed by CCTA. The 2005 PM peak hour model satisfies all the CCTA validation criteria, while the AM peak hour model does not. In comparison to the existing intersection counts, the 2005 AM peak hour model underestimates volumes by about 10 to 20 percent. The underestimation is across the study area and not in isolated areas. In addition, the underestimation would likely continue to occur in the future year model scenarios. The model results are not being used directly for analysis, but rather are “Furnessed.” So, the underestimation in both the existing baseline and future forecasts are accounted for in the “Furness” process.

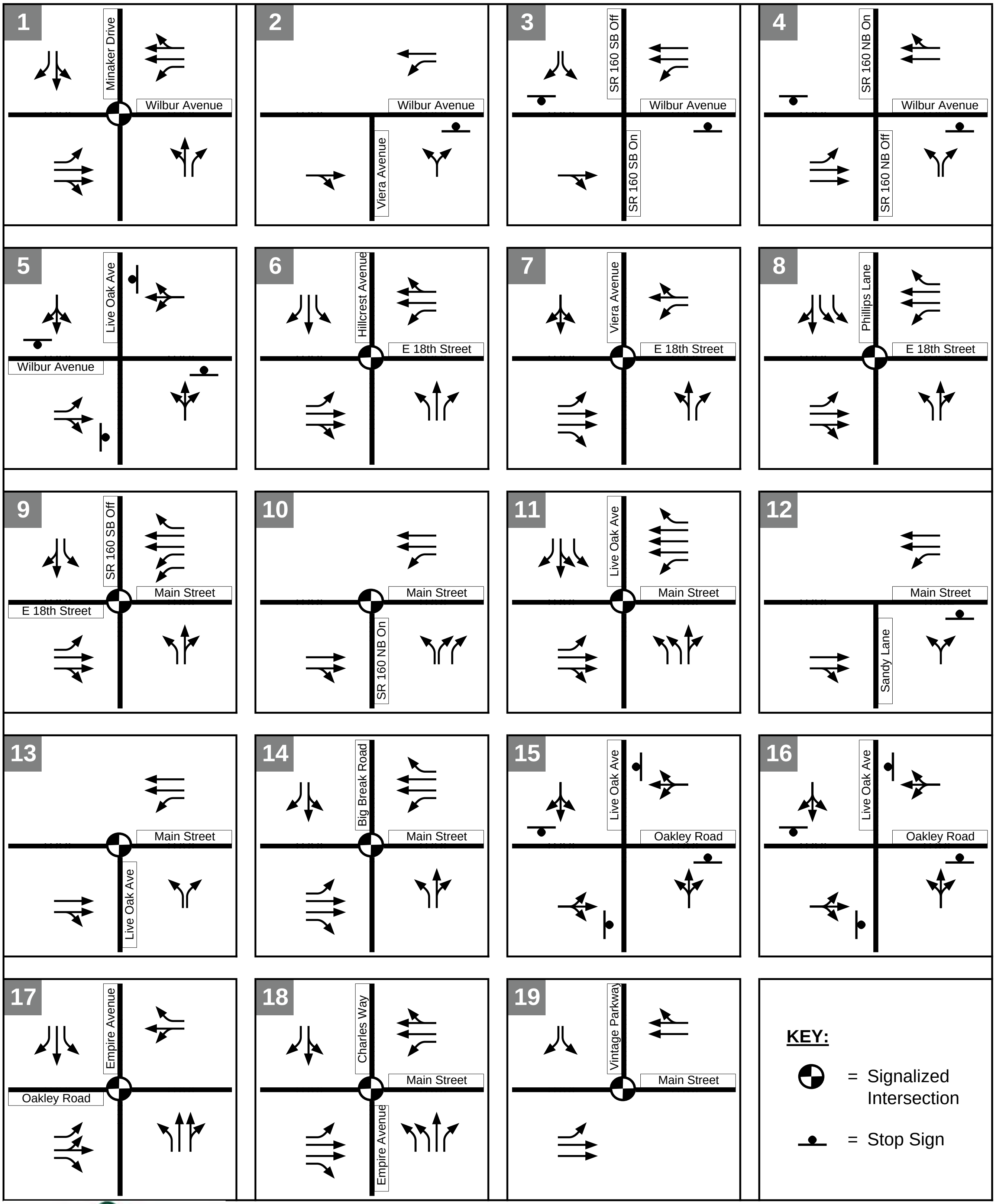
Year 2010 Travel Demand Model

The year 2010 scenario in the Countywide travel demand model was updated to include the latest anticipated development projects in the study area. Appendix D lists approved and planned developments in the Cities of Antioch and Oakley. The year 2010 land use database included in the Countywide model is based on the Association of Bay Area Governments (ABAG) *Projections 2005*. The land use database was reviewed and updated to include the list of approved and planned projects. In addition, the roadway network was reviewed and updated to include the near term roadway improvements previously discussed.

Year 2010 Intersection Volume Forecasts

The year 2005 and 2010 AM and PM peak hour forecasts were used to develop intersection turning movement volumes by using the “Furnessing” technique. Intersection volumes were balanced to present consistent volumes throughout the study area. The Near Term (2010) No Project AM and PM peak hour intersection volumes are presented on Figure 8.

The completion of Segment 1 of the SR 4 Bypass would serve much of the through traffic that currently uses Main Street to access southern parts of Oakley, Brentwood and beyond. Thus, despite the projected growth in the study area, through traffic volumes along Main Street are forecast to decrease by about 10 to 30 percent in comparison to existing conditions. Traffic volumes along other arterials and collectors are projected to increase commensurate with the expected growth in the area.



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NEAR-TERM (2010)
INTERSECTION LANE CONFIGURATIONS & TRAFFIC CONTROL

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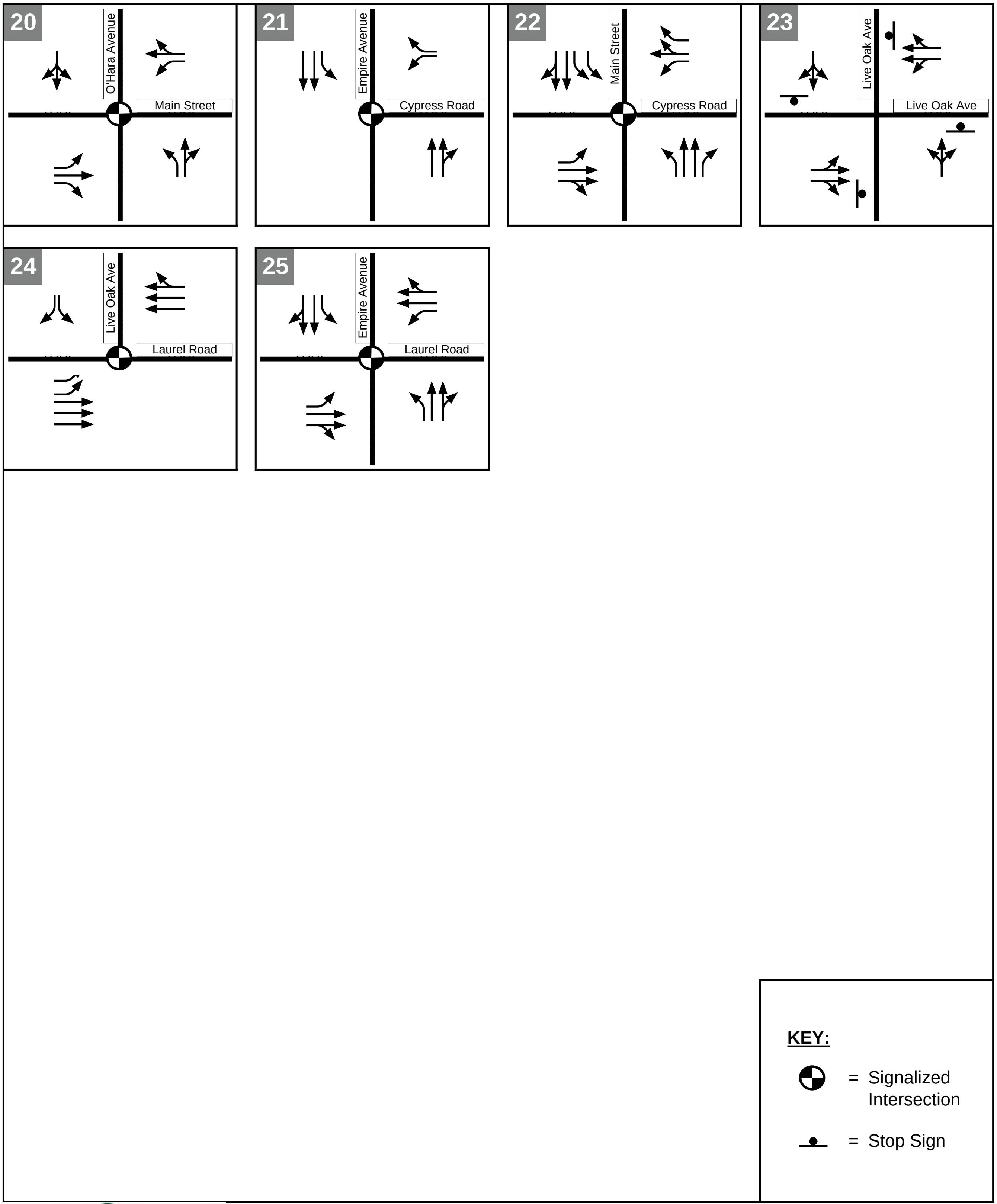
Figure 7A



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NEAR-TERM 2010
INTERSECTION LANE CONFIGURATIONS & TRAFFIC CONTROL

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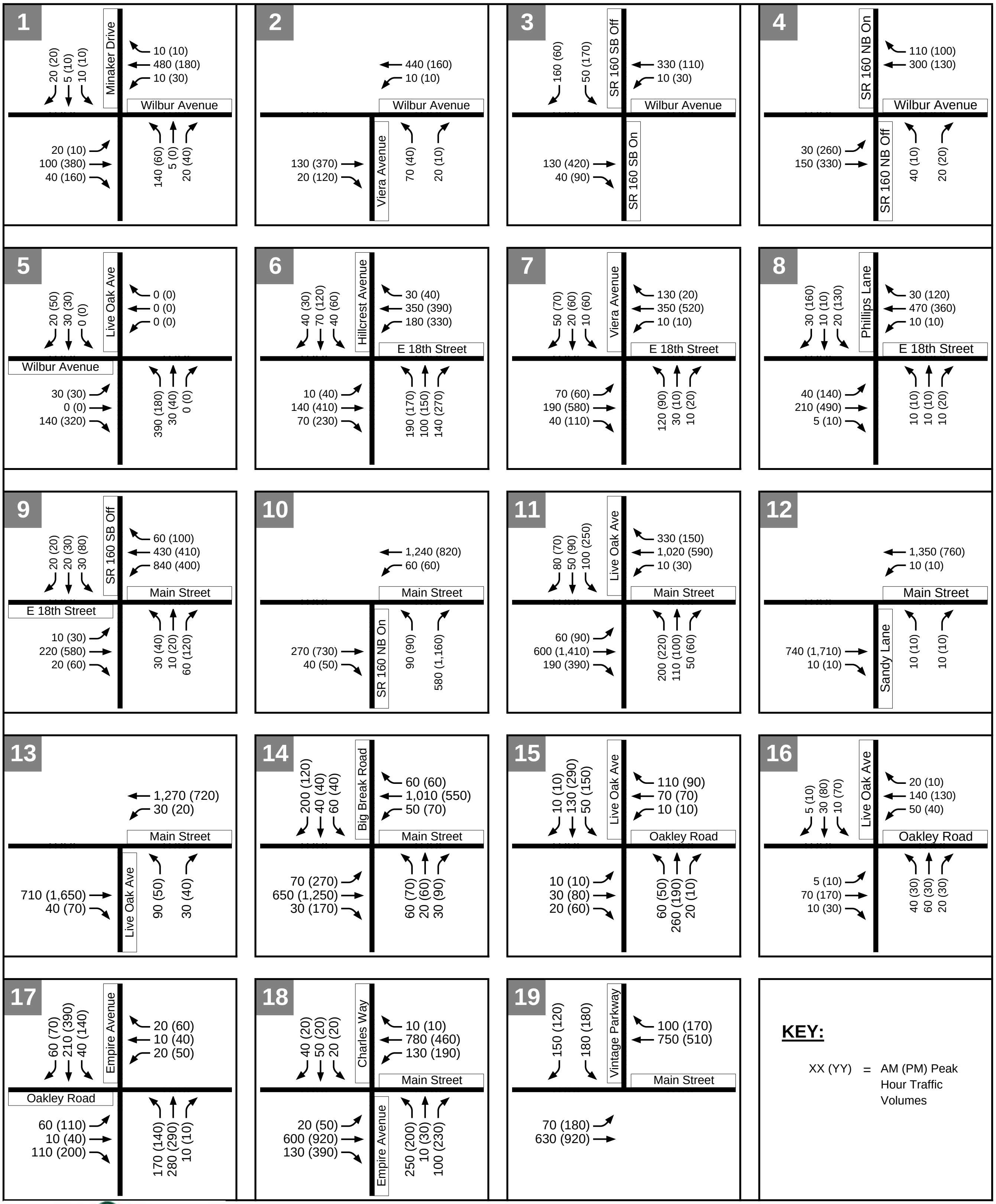
Figure 7B



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NEAR-TERM (2010) NO PROJECT
PEAK HOUR INTERSECTION VOLUMES

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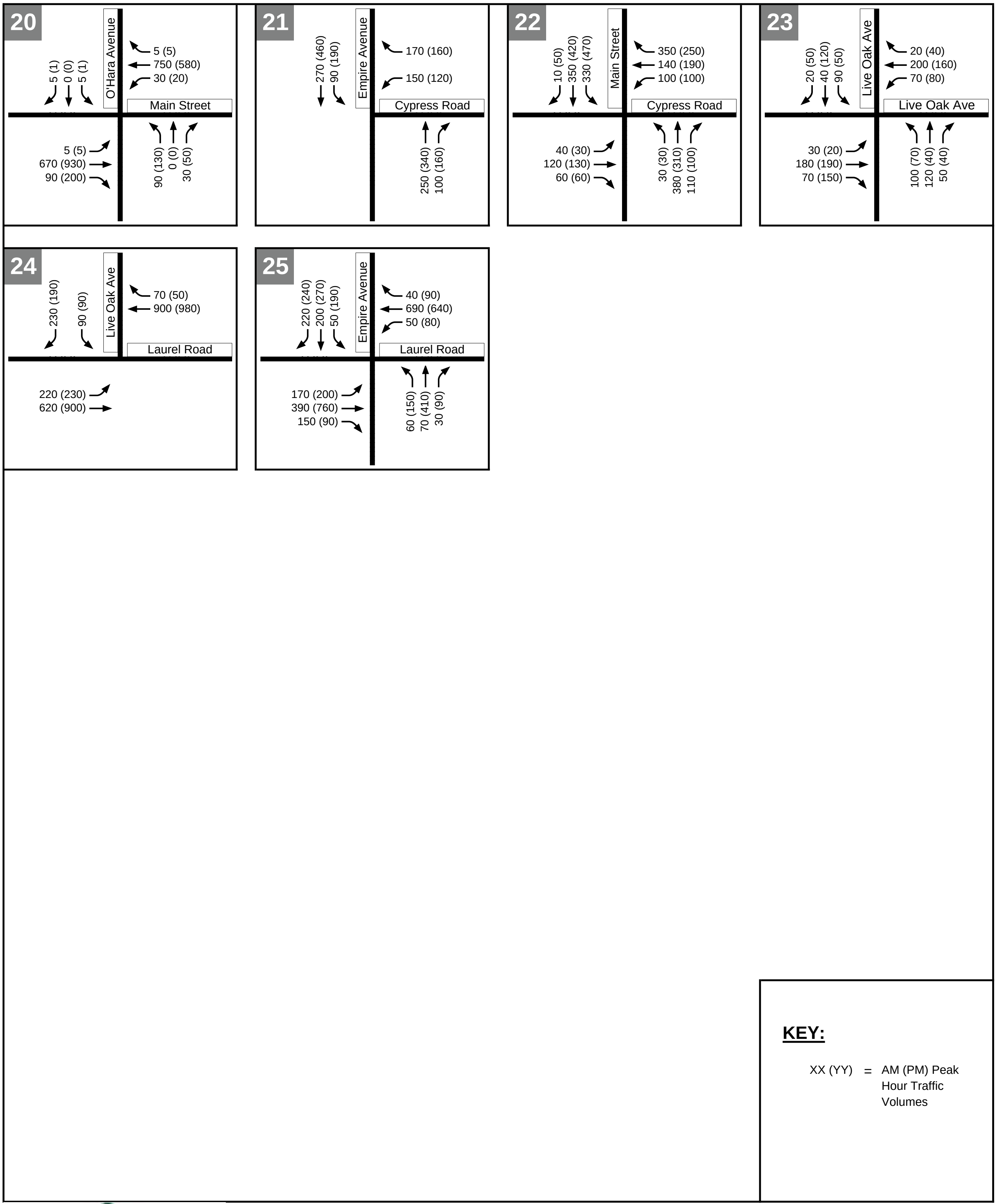
Figure 8A



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NEAR-TERM (2010) NO PROJECT PEAK HOUR INTERSECTION VOLUMES

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Figure 8B

NEAR TERM NO PROJECT CONDITIONS

The Near Term (year 2010) No Project conditions analysis was performed using the same methods previously discussed. Table 8 summarizes the intersection LOS analysis results of the Near Term No Project conditions. Appendix B contains the LOS calculation worksheets. In general, intersections along Main Street would operate at slightly better LOS than under existing conditions, and most other intersections would operate at slightly worse LOS.

Under the Near Term No Project conditions, the only intersection operating worse than LOS D is the Main Street/ Sandy Lane intersection during the PM peak hour. As in Existing conditions, the small number of vehicles on northbound Sandy Lane would experience LOS F conditions during the PM peak hour. The intersection would not satisfy the MUTCD peak hour signal warrant.

NEAR TERM WITH PROJECT CONDITIONS

The AM and PM peak hour traffic volumes generated by the project and described in Chapter 3 were added to the Near Term No Project conditions traffic volumes to estimate the Near Term With Project volumes. The AM and PM peak hour traffic volumes are shown on Figure 9.

For the Near Term With Project conditions analysis, access to the project site would be provided via four driveways along Main Street: opposite Sandy Lane, between Sandy Lane and Live Oak Avenue (called Project Driveway Center), opposite Live Oak Avenue, and east of Live Oak Avenue (Project Driveway East); and one driveway on Bridgehead Road, north of Main Street. The analysis assumes that the five intersections providing full access to the project site would be signalized as part of the project (see Chapter 6 for project access analysis).

Table 8 summarizes the intersection LOS analysis results of the Near Term With Project conditions. Appendix B contains the LOS calculation worksheets. Under Near Term With Project conditions, all study intersections would continue to operate at acceptable service levels during the AM peak hour. The addition of project traffic would cause the following study intersections to operate at unacceptable service levels during the PM peak hour:

#3 The stop-controlled southbound approach at the Wilbur Avenue/Southbound SR 160 Ramps intersection would operate at LOS F (delay >60 seconds). However, the intersection would not satisfy the MUTCD peak hour signal warrant with the addition of project generated traffic. Thus, the proposed project would not cause a significant impact at this intersection under Near Term With Project conditions.

#11 The signalized Main Street/Bridgehead Road/Neroly Road intersection would operate at LOS E (v/c = 0.92 and delay = 56 seconds).

#16 The all-way stop-controlled Oakley Road/Live Oak Avenue intersection would operate at LOS F (delay > 60 seconds), and the intersection would satisfy the MUTCD peak hour signal warrant with the addition of project generated traffic.

#23 The all-way stop-controlled Neroly Road/Live Oak Avenue intersection would operate at LOS F (delay = 50 seconds), and the intersection would satisfy the MUTCD peak hour signal warrant with the addition of project generated traffic.

TABLE 8
NEAR TERM (2010) WITH AND WITHOUT PROJECT CONDITIONS
INTERSECTION PEAK HOUR LOS SUMMARY

Intersection	Control[1]	Peak Hour	NEAR TERM NO PROJECT				NEAR TERM WITH PROJECT			
			CCTALOS		HCM		CCTALOS		HCM	
			V/C Ratio[2]	LOS	Delay[3]	LOS	V/C Ratio[2]	LOS	Delay[3]	LOS
1. Wilbur Avenue/Minaker Drive	Signal	AM	0.25	A	10	A	0.26	A	10	B
		PM	0.23	A	9	A	0.24	A	9	A
2. Wilbur Avenue/Viera Avenue	SSSC	AM	--	--	2 (14)	A (B)	--	--	2 (15)	A (C)
		PM	--	--	1 (14)	A (B)	--	--	1 (15)	A (C)
3. Wilbur Avenue/SR 160 SB Ramps	SSSC	AM	--	--	3 (11)	A (B)	--	--	4 (12)	A (B)
		PM	--	--	7 (26)	A (D)	--	--	**25 (>60)**	**D (F)**
4. Wilbur Avenue/SR 160 NB Ramps	SSSC	AM	--	--	1 (11)	A (B)	--	--	1 (12)	A (B)
		PM	--	--	3 (16)	A (C)	--	--	3 (20)	A (C)
5. Wilbur Avenue/Bridgehead Road	AWSC	AM	--	--	12	B	--	--	15	B
		PM	--	--	10	A	--	--	15	C
6. East 18th Street/Hillcrest Avenue	Signal	AM	0.33	A	19	B	0.35	A	19	B
		PM	0.57	A	26	C	0.61	B	28	C
7. East 18th Street/Viera Avenue	Signal	AM	0.42	A	7	A	0.45	A	7	A
		PM	0.49	A	6	A	0.56	A	7	A
8. East 18th Avenue/Phillips Lane	Signal	AM	0.20	A	14	B	0.22	A	14	B
		PM	0.32	A	16	B	0.36	A	16	B
9. Main Street/SR 160 SB Ramps	Signal	AM	0.41	A	16	B	0.47	A	15	B
		PM	0.46	A	29	C	0.58	A	29	C
10. Main Street/SR 160 NB Ramps	Signal	AM	0.51	A	11	B	0.57	A	11	B
		PM	0.60	A	18	B	0.72	C	23	C
11. Main Street/Bridgehead Road/Neroly Road	Signal	AM	0.39	A	20	B	0.47	A	20	C
		PM	0.77	C	36	D	**0.92**	**E**	**56**	**E**
12. Main Street/Sandy Lane	SSSC/ Signal[4]	AM	--	--	0 (20)	A (C)	0.50	A	6	A
		PM	--	--	**1 (>60)**	**A (F)**	0.70	B	16	B
13. Main Street/Live Oak Avenue	Signal	AM	0.42	A	7	A	0.56	A	17	B
		PM	0.54	A	4	A	0.80	C	31	C
14. Main Street/Big Break Road	Signal	AM	0.46	A	16	B	0.53	A	15	B
		PM	0.54	A	26	C	0.66	B	21	C
15. Oakley Road/Neroly Road	AWSC	AM	--	--	12	B	--	--	13	B
		PM	--	--	15	B	--	--	23	C
16. Oakley Road/Live Oak Avenue	AWSC	AM	--	--	9	A	--	--	12	B
		PM	--	--	10	A	--	--	**>60**	**F**
17. Oakley Road/Empire Avenue	Signal	AM	0.27	A	19	B	0.31	A	19	B
		PM	0.43	A	23	C	0.52	A	26	C

TABLE 8
NEAR TERM (2010) WITH AND WITHOUT PROJECT CONDITIONS
INTERSECTION PEAK HOUR LOS SUMMARY

Intersection	Control[1]	Peak Hour	NEAR TERM NO PROJECT				NEAR TERM WITH PROJECT			
			CCTALOS		HCM		CCTALOS		HCM	
			V/C Ratio[2]	LOS	Delay[3]	LOS	V/C Ratio[2]	LOS	Delay[3]	LOS
18. Main Street/Empire Avenue	Signal	AM	0.39	A	19	B	0.43	A	20	B
		PM	0.48	A	20	B	0.60	A	22	C
19. Main Street/Vintage Parkway	Signal	AM	0.39	A	11	B	0.44	A	12	B
		PM	0.41	A	11	B	0.50	A	12	B
20. Main Street/O'Hara Avenue	Signal	AM	0.52	A	11	B	0.60	A	14	B
		PM	0.66	B	13	B	0.82	D	23	C
21. Cypress Road/Empire Avenue	Signal	AM	0.24	A	11	B	0.27	A	11	B
		PM	0.33	A	12	B	0.39	A	12	B
22. Cypress Road/Main Street	Signal	AM	0.35	A	22	C	0.39	A	23	C
		PM	0.38	A	34	C	0.46	A	29	C
23. Neroly Road/Live Oak Avenue	AWSC	AM	--	--	12	B	--	--	17	C
		PM	--	--	12	B	--	--	**50**	**F**
24. Laurel Road/Live Oak Avenue	Signal	AM	0.32	A	10	A	0.37	A	13	B
		PM	0.33	A	9	A	0.43	A	13	B
25. Laurel Road/Empire Avenue	Signal	AM	0.49	A	21	C	0.51	A	22	C
		PM	0.61	B	30	C	0.65	B	32	C
26. Bridgehead Road/Project Driveway	N/A/ Signal	AM	--	--	--	--	0.36	A	10	A
		PM	--	--	--	--	0.36	A	11	B
27. Main Street/Project Driveway Center	N/A/ Signal	AM	--	--	--	--	0.47	A	4	A
		PM	--	--	--	--	0.67	B	11	B
28. Main Street/Project Driveway East	N/A/ Signal	AM	--	--	--	--	0.45	A	3	A
		PM	--	--	--	--	0.63	B	7	A

Bold indicates intersection operating at deficient level of service.

1. Signal = Signalized intersection
   SSSC = Side-street stop-controlled intersection
   AWSC = All-way stop-controlled intersection
2. Volume-to-capacity ratio (V/C) determined for all signalized intersections using the CCTALOS methodology.
3. Average intersection delay is calculated for all signalized and unsignalized intersections using the 2000 *Highway Capacity Manual* (HCM) methods. For side-street stop-controlled intersections, average intersection delay (in seconds per vehicle) is presented. Delay for worst approach is shown in brackets.
4. Intersection is side-street stop-controlled under Near Term No Project conditions, but will be signalized under Near Term with Project conditions.

Source: Fehr & Peers, 2006.

NEAR TERM INTERSECTION IMPACTS AND MITIGATIONS

Based on the application of the significance criteria presented in Chapter 1, three significant impacts were identified. These impacts and mitigation are described below.

IMPACT 1:	The addition of project traffic would cause the signalized Main Street/Bridgehead Road/Neroly Road intersection (#11) to operate at unacceptable LOS E during the PM peak hour, causing a significant impact under Near Term With Project conditions.
ANALYSIS:	The intersection would operate at an acceptable LOS under Near Term No Project conditions (LOS C [v/c = 0.77] based on CCTALOS and LOS D [delay = 36 seconds] based on HCM) during the PM peak hour. The proposed project would cause the intersection to operate at unacceptable LOS E (v/c = 0.92 and delay = 56 seconds) during the PM peak hour. The intersection would operate at a deficient level due to project traffic added to the eastbound and southbound approaches of the intersection.
MITIGATION MEASURE 1:	Currently, the southbound approach provides one exclusive right-turn lane, one shared through/left-turn lane, and an exclusive left-turn lane. Mitigation of the unacceptable conditions at Main Street/Bridgehead Road/Neroly Road intersection shall be achieved by adding a second exclusive left-turn lane to provide one exclusive right-turn lane, one through lane, and two left-turn lanes on the southbound approach. This improvement is part of the Main Street widening project which is included in the City's Capital Improvement Program and Transportation Impact Fee Program. The project shall contribute to this mitigation by paying its fair share of the cost through the payment of the City's Transportation Impact Fee.

The Main Street/Bridgehead Road/Neroly Road intersection would operate at LOS D (v/c = 0.87 and delay = 42 seconds) during the PM peak hour with implementation of this mitigation measure. This impact would be reduced to a ***less-than-significant*** level with the implementation of this mitigation measure.

IMPACT 2:	The addition of project traffic would cause the all-way stop-controlled Oakley Road/Live Oak Avenue intersection (#16) to operate at unacceptable LOS F during the PM peak hour. The forecasted PM peak hour intersection volumes would also satisfy the MUTCD peak hour signal warrant. This is a significant impact under Near Term With Project conditions.
ANALYSIS:	The intersection would operate at acceptable LOS A (delay = 10 seconds) under Near Term No Project conditions. The proposed project would cause the intersection to operate at unacceptable LOS F (delay > 60 seconds) during the PM peak hour. The intersection would operate at a deficient level due to project traffic added to the northbound and southbound approaches of the intersection.

MITIGATION MEASURE 2: Mitigation of the unacceptable conditions at the Oakley Road/Live Oak Avenue intersection shall be achieved by signalizing the intersection and providing exclusive left-turn lanes on all approaches[2]. The installation of a signal at the Oakley Road/Live Oak Avenue intersection is included in the City's Transportation Impact Fee Program. The project shall contribute to this mitigation by paying its fair share of the cost through the payment of the City's Transportation Impact Fee.

The Oakley Road/Live Oak Avenue intersection would operate at acceptable LOS (LOS A [v/c = 0.46] based on CCTALOS and LOS B [delay = 16 seconds] based on HCM) during the PM peak hour with implementation of this mitigation measure. This impact would be reduced to a ***less-than-significant*** level with the implementation of this mitigation measure.

IMPACT 3: The addition of project traffic would cause the all-way stop-controlled Neroly Road/Live Oak Avenue intersection (#23) to operate at unacceptable LOS F during the PM peak hour. The forecasted PM peak hour intersection volumes would also satisfy the MUTCD peak hour signal warrant. This is a significant impact under Near Term With Project conditions.

ANALYSIS: The intersection would operate at acceptable LOS B (delay = 12 seconds) under Near Term No Project conditions. The proposed project would cause the intersection to operate at unacceptable LOS F (delay = 50 seconds) during the PM peak hour. The intersection would operate at a deficient level due to project traffic added to the southbound through and left-turn, northbound through, and westbound right-turn movements at the intersection.

MITIGATION MEASURE 3: Mitigation of the unacceptable conditions at the Neroly Road/Live Oak Avenue intersection shall be achieved by signalizing the intersection and providing exclusive left-turn lanes on the northbound and southbound approaches[3]. The installation of a signal at the Neroly Road/Live Oak Avenue intersection is included in the City's Transportation Impact Fee Program. The project shall contribute to this mitigation by paying its fair share of the cost through the payment of the City's Transportation Impact Fee.

The Neroly Road/Live Oak Avenue intersection would operate at acceptable LOS (LOS A [v/c = 0.51] based on CCTALOS and LOS C [delay = 25 seconds] based on HCM) during the PM peak hour with implementation of this

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[2] This analysis is intended to examine the general correlation between the planned level of future development and the need to install new traffic signals. It estimates future development-generated traffic compared against a sub-set of the standard traffic signal warrants recommended in the Federal Highway Administration *Manual on Uniform Traffic Control Devices* and associated State guidelines. This analysis should not serve as the only basis for deciding whether and when to install a signal. To reach such a decision, the full set of warrants should be investigated based on field-measured, rather than forecast, traffic data and a thorough study of traffic and roadway conditions by an experienced engineer. Furthermore, the decision to install a signal should not be based solely upon the warrants, since the installation of signals can lead to certain types of collisions. The City of Oakley should undertake regular monitoring of actual traffic conditions and accident data, and timely re-evaluation of the full set of warrants in order to prioritize and program intersections for signalization.

[3] See Footnote 2.

mitigation measure. This impact would be reduced to a ***less-than-significant*** level with the implementation of this mitigation measure.

NEAR TERM WITH PROJECT MITIGATED CONDITIONS

All intersections would operate at acceptable conditions with the implementation of the recommended mitigation measures outlined in the previous section. Table 9 summarizes the LOSs at the study intersection after the implementation of these recommended improvements.

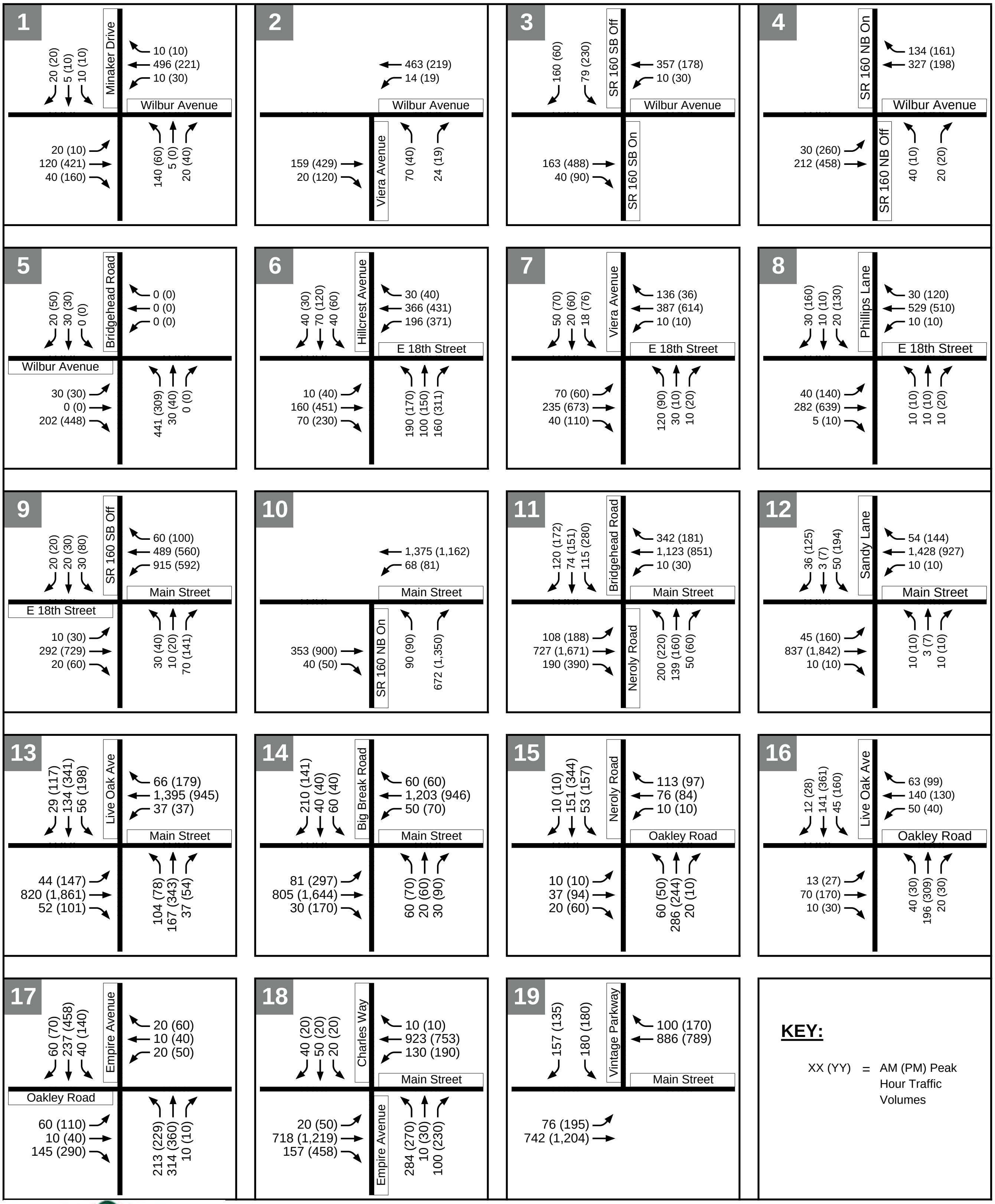
TABLE 9
MITIGATED NEAR TERM (2010) WITH PROJECT CONDITIONS
INTERSECTION PEAK HOUR LOS SUMMARY

Study Intersection	Control[1]	Peak Hour	NEAR TERM WITH PROJECT				NEAR TERM WITH PROJECT MITIGATED			
			CCTALOS		HCM		CCTALOS		HCM	
			V/C Ratio[2]	LOS	Delay[3]	LOS	V/C Ratio[2]	LOS	Delay[3]	LOS
11. Main Street/Bridgehead Road/Neroly Road	Signal	AM	0.47	A	20	C	0.45	A	18	B
		PM	**0.92**	**E**	**56**	**E**	0.87	D	42	D
16. Oakley Road/Live Oak Avenue	AWSC/ Signal	AM	--	--	12	B	0.29	A	13	B
		PM	--	--	**>60**	**F**	0.46	A	16	B
23. Neroly Road/Live Oak Avenue	AWSC/ Signal	AM	--	--	17	C	0.43	A	24	C
		PM	--	--	**50**	**F**	0.51	A	25	C

Bold indicates intersection operating at deficient level of service.

1. Signal = Signalized intersection
   SSSC = Side-street stop-controlled intersection
   AWSC = All-way stop-controlled intersection
2. Volume-to-capacity ratio (V/C) determined for all signalized intersections using the CCTALOS methodology.
3. Average intersection delay is calculated for all signalized and unsignalized intersections using the 2000 *Highway Capacity Manual* (HCM) methods. For side-street stop-controlled intersections, average intersection delay (in seconds per vehicle) is presented. Delay for worst approach is shown in brackets.

Source: Fehr & Peers, 2006.



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NEAR-TERM (2010) WITH PROJECT PEAK HOUR INTERSECTION VOLUMES

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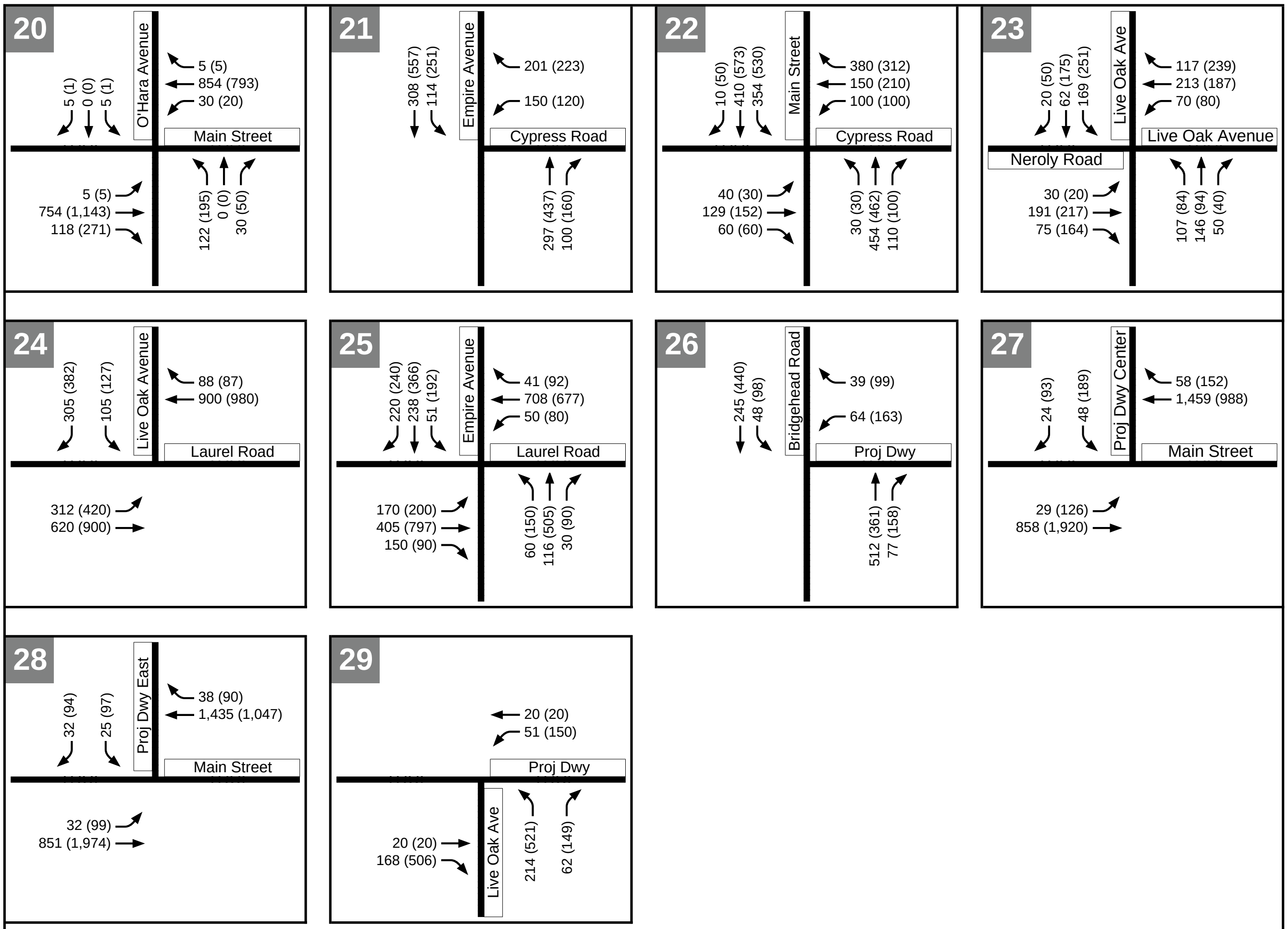
Figure 9A



KEY:

XX (YY) = AM (PM) Peak Hour Traffic Volumes

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NEAR-TERM (2010) WITH PROJECT PEAK HOUR INTERSECTION VOLUMES

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Figure 9B

NEAR TERM CONDITIONS FREEWAY OPERATIONS ANALYSIS

Table 10 summarizes the freeway delay index analysis results under Near Term No Project and Near Term With Project conditions. Based on the analysis, the study freeway segments would satisfy their established TSO in both the AM and PM peak hour periods. As there are no significant impacts associated with the project for freeway delay, no mitigation is required.

TABLE 10
NEAR TERM (YEAR 2010) WITH AND WITHOUT PROJECT CONDITIONS
FREEWAY DELAY INDEX SUMMARY

Freeway Segment	Peak Hour	TSO[1]	Near Term No Project		Near Term With Project	
			EB or NB[2]	WB or SB[3]	EB or NB[2]	WB or SB[3]
SR 4 between Hillcrest Avenue and SR 160/SR 4 Bypass	AM PM	2.5 2.5	1.0 1.1	1.0 1.0	1.0 1.1	1.0 1.0
SR 160 between SR 4/SR 4 Bypass and Main Street	AM PM	2.5 2.5	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0
SR 160 between Main Street and Wilbur Avenue	AM PM	2.0 2.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0
SR 160 between Wilbur Avenue and Antioch Bridge Toll Plaza	AM PM	2.0 2.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0
SR 4 Bypass between SR 4/SR 160 and Laurel Road	AM PM	2.0 2.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0
SR 4 Bypass between Laurel Road and Lone Tree Way	AM PM	2.0 2.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0

Results in **bold** represent freeway segments exceeding established TSO
1. Traffic Service Objective (TSO) as established by CCTA.
2. Delay index in the eastbound or northbound direction.
3. Delay index in the westbound or southbound direction.

Source: Fehr & Peers, 2006.

5. CUMULATIVE TRAFFIC CONDITIONS

This chapter discusses Cumulative (year 2030) traffic conditions based on conditions under the buildout of the City's General Plan, both without and with the project.

CUMULATIVE ROADWAY IMPROVEMENTS

Significant roadway network changes are expected in the study area in the future. Major roadway improvements planned for the near future and assumed to be completed for the Cumulative conditions analysis include:

- Completion of segment 2 of the SR 4 Bypass as a four-lane freeway between Lone Tree Way and Balfour Road with full interchanges at Sand Creek Road and Balfour Road
- Completion of segment 3 of the SR 4 Bypass between Balfour Road and Vasco Road a two-lane expressway with intersections at Marsh Creek Road and Walnut Avenue
- Widening of SR 4 freeway to provide three mixed-flow lanes and one high-occupancy vehicle (HOV) lane in each direction west of Hillcrest Avenue
- Widening of Main Street to a six lane arterial between Big Break Road and SR 160
- Completion of the Main Street Bypass in downtown Oakley
- Widening of Laurel Road to a four-lane arterial between Empire Avenue and Main Street
- Extension of Live Oak Avenue from Main Street to Wilbur Avenue
- Completion of the connector ramps between SR 4 Bypass and SR 160. Since the completion of these ramps is not currently fully funded, a supplemental analysis without the completion of these ramps is presented in Appendix E. Thus, if the connector ramps between SR 4 Bypass and SR 160 are not constructed, impacts and mitigations presented in Appendix E would be applicable instead of the impacts and mitigations presented in this chapter.

Figure 10 shows the expected lane configurations and traffic controls under Cumulative conditions.

CUMULATIVE TRAFFIC FORECASTS

Similar to the Near Term conditions, the CCTA Decennial Countywide Travel Demand Model was selected as the most appropriate tool to forecast Cumulative (2030) No Project AM and PM peak hour intersection volumes. The CCTA model was executed for years 2005 and 2030 and the results were used to develop intersection turning movement volumes through the "Furnessing" technique, an iterative process which develops future turning movement volumes by applying the difference between the base model volumes and the existing intersection counts to future model approach and departure volumes.

Year 2030 Travel Demand Model

The year 2030 roadway network included in the Countywide Model was reviewed and updated to include the Cumulative roadway improvements previously discussed. The year 2030 land use database in the Countywide model is based on ABAG *Projections 2005*. In order to include all of the future planned development expected in

Oakley, the land use database within the City of Oakley was modified to reflect the buildout of the City's General Plan.

The City of Oakley General Plan identifies the northwest area of Oakley as being predominantly commercial and industrial, and allows for relatively high intensities of employment-based development. However, based on specific proposed developments in the area, and similar commercial and industrial developments in other parts of East Contra Costa County, the likely intensity of development in the study area is lower than the maximum envisioned in the General Plan. Therefore, to represent a more realistic analysis of future conditions, and to be consistent with recent studies in the area, less intense employment is assumed for the Northwest Oakley area. This is consistent with the assumptions in the proposed Cline Property Specific Plan. Table 11 compares the assumptions between the maximum buildout allowed by the General Plan and the reduced employment scenario used for this analysis. In general, the reduced employment scenario, which assumes less developable area, lower floor-area ratios (FAR), and more square feet per employee, results in 40 percent fewer jobs in the study area than the General Plan buildout scenario (11,400 compared to 18,900). The reduced employment scenario would still provide higher density employment in the Northwest Oakley area as compared to the ABAG *Projections 2005* (11,400 compared to 9,980 jobs).

TABLE 11
CUMULATIVE CONDITIONS
LAND DEVELOPMENT ASSUMPTIONS

Scenario[1]	Building Area (SF)	Average FAR (SF/acre)	Building Area/Job (SF/job)	Total Jobs
ABAG *Projections 2005*	N/A	N/A	N/A	9,980
Maximum Buildout under General Plan	N/A	0.40 to 2.0	250 to 600	18,900
Reduced Employment	6,991,000	0.25 to 0.30	350 to 1,000	11,400

1. For all scenarios, the Northwest Oakley study area consists of about 660 acres bounded by SR 4 and SR 160 freeways to the west, the water to the north, Big Break Road and Main Street to the east, and Oakley Road to the south.

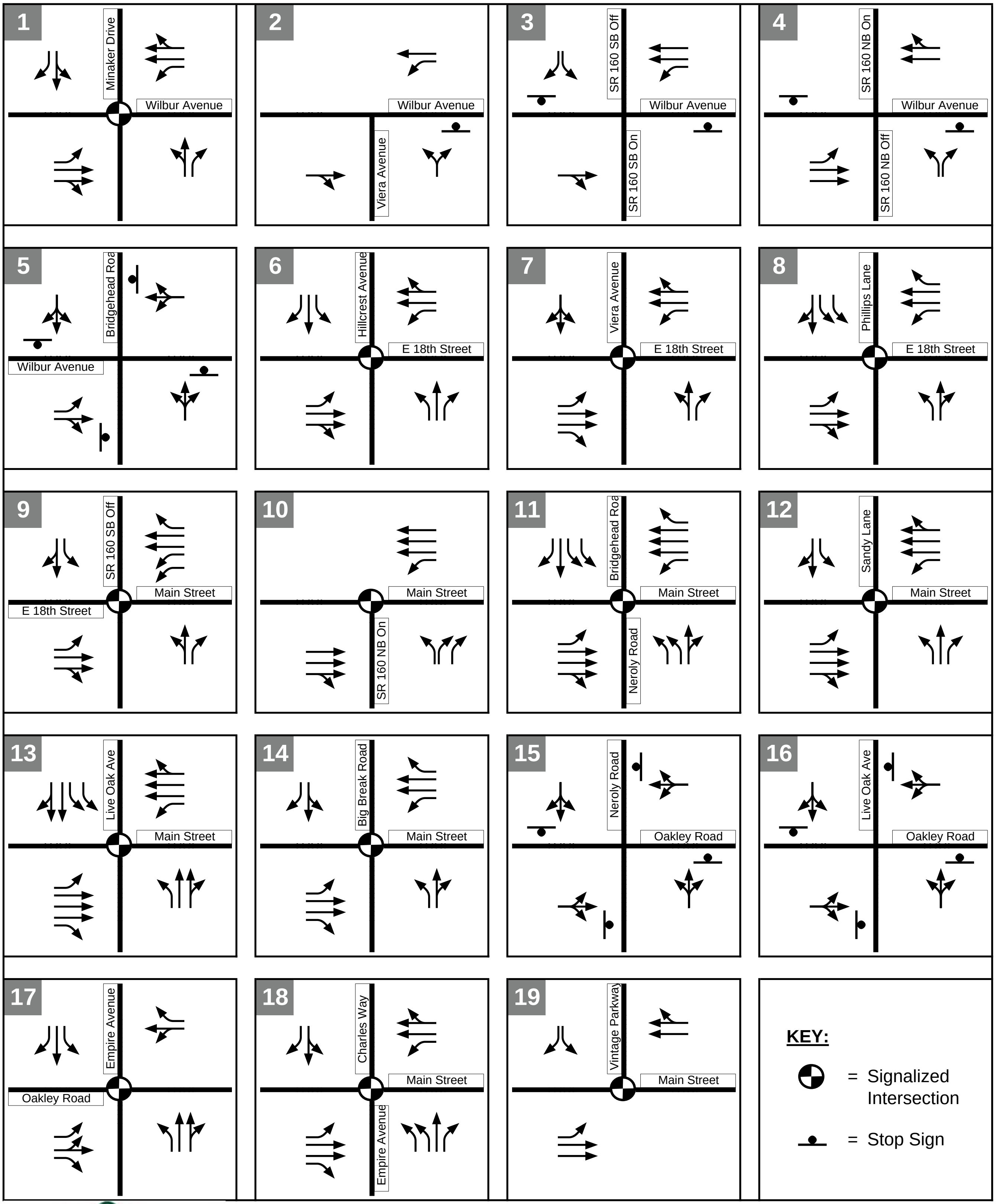
Source: ABAG, City of Oakley, Richard Loewke, Sedway Group.

Year 2030 intersection Volume Forecasts

Similar to the Near Term intersection volumes, the Cumulative conditions intersection turning movement volumes were developed by "Furnessing" year 2005 and 2030 AM and PM peak hour model forecasts. Intersection volumes were also adjusted to present consistent volumes throughout the study area. The Cumulative (2030) No Project AM and PM peak hour intersection volumes are presented on Figure 11. Due to general growth in the region, traffic volumes in the study area are generally higher than under the Near Term scenario.

ANALYSIS OF CUMULATIVE NO PROJECT CONDITIONS

The Cumulative (year 2030) No Project conditions analysis was performed using the same methods previously discussed. Table 12 summarizes the intersection LOS analysis of the Cumulative No Project conditions. Appendix B contains the LOS calculation worksheets. In general, most study intersections operate with worse LOS under the Cumulative conditions than under Near Term conditions. Based on the analysis, the following intersections would operate at unacceptable conditions under the Cumulative No Project conditions:



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CUMULATIVE (2030)
INTERSECTION LANE CONFIGURATIONS & TRAFFIC CONTROL

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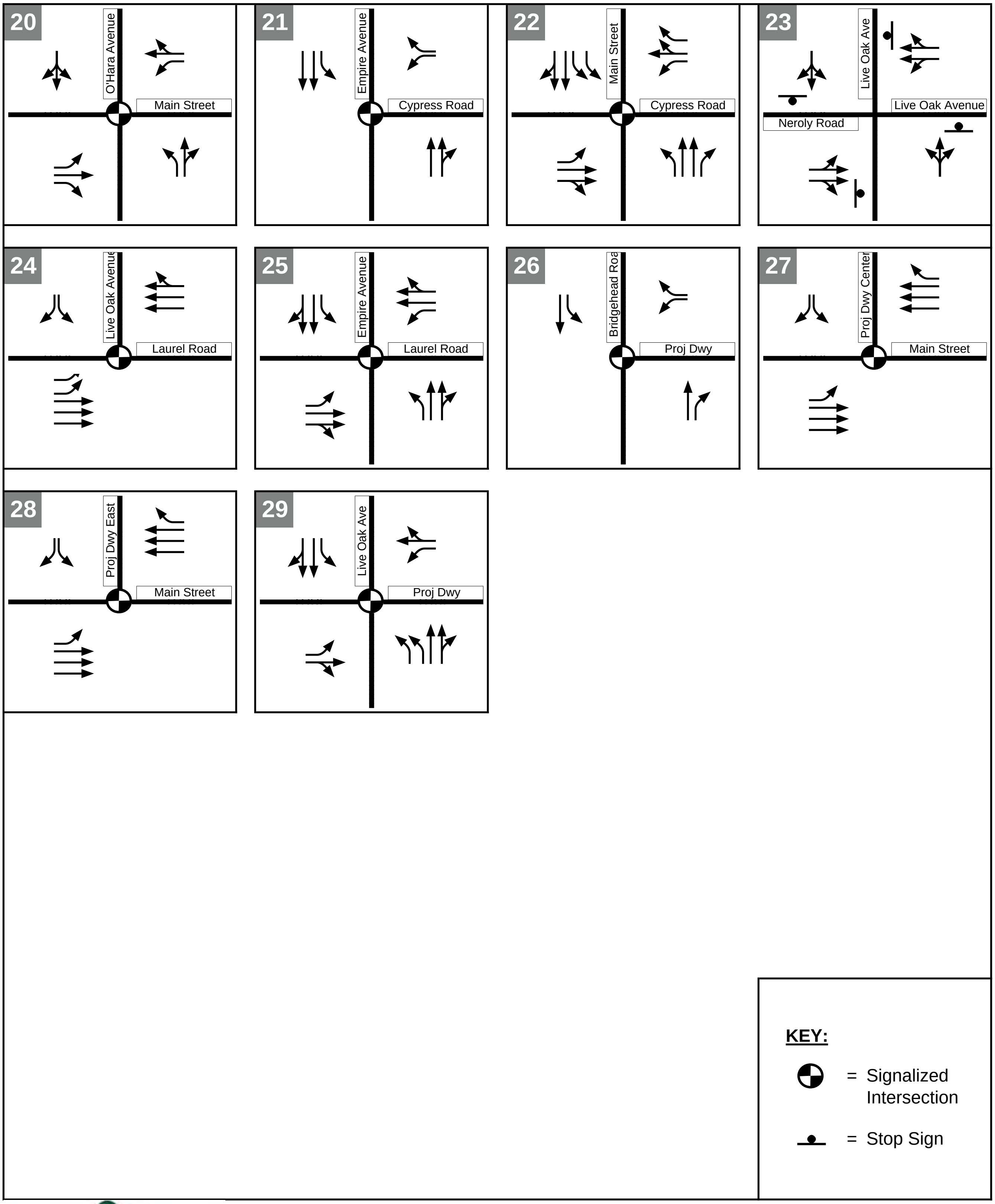
Figure 10A



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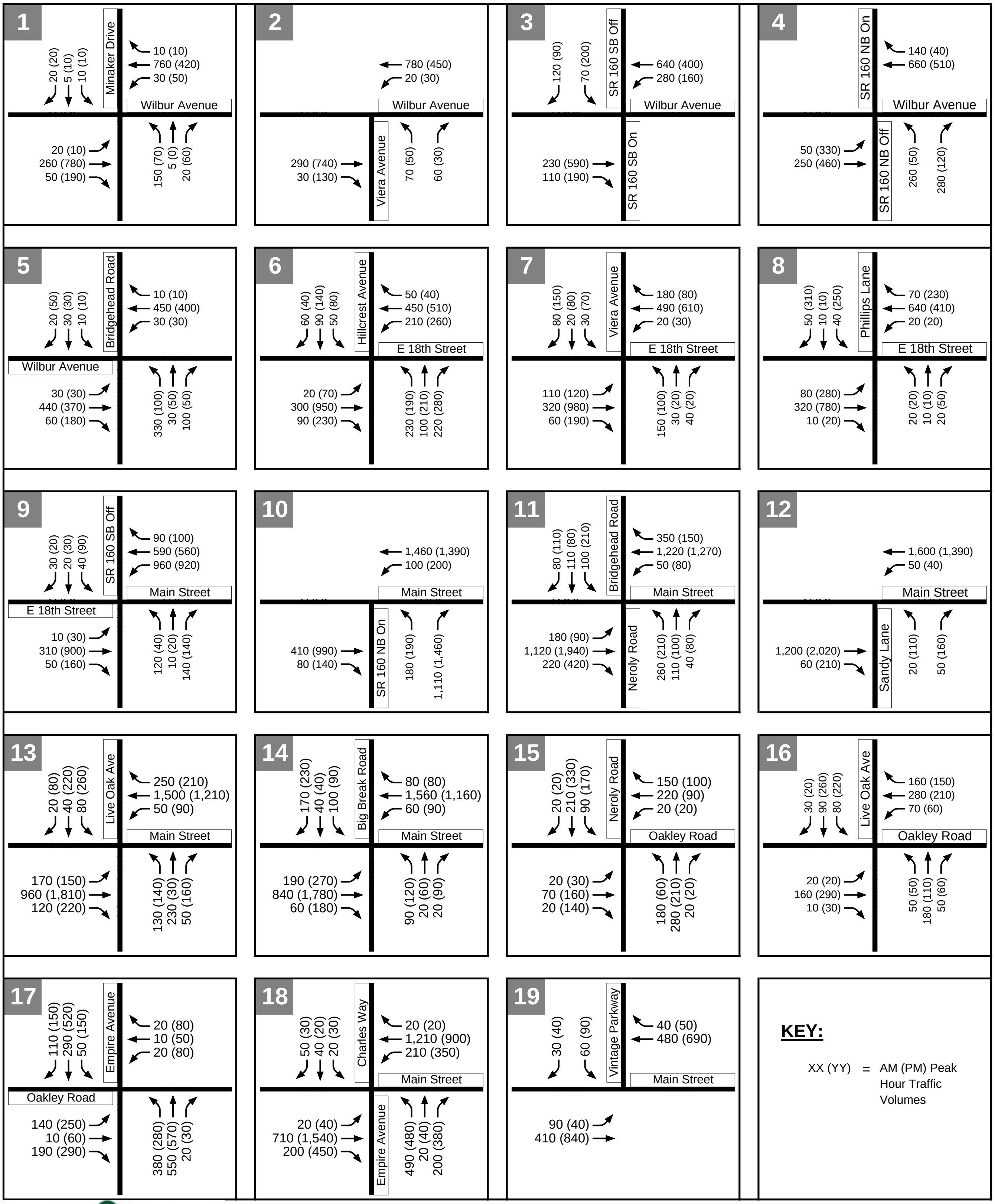
CUMULATIVE (2030)
INTERSECTION LANE CONFIGURATIONS & TRAFFIC CONTROL

Figure 10B



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CUMULATIVE (2030) NO PROJECT PEAK HOUR INTERSECTION VOLUMES

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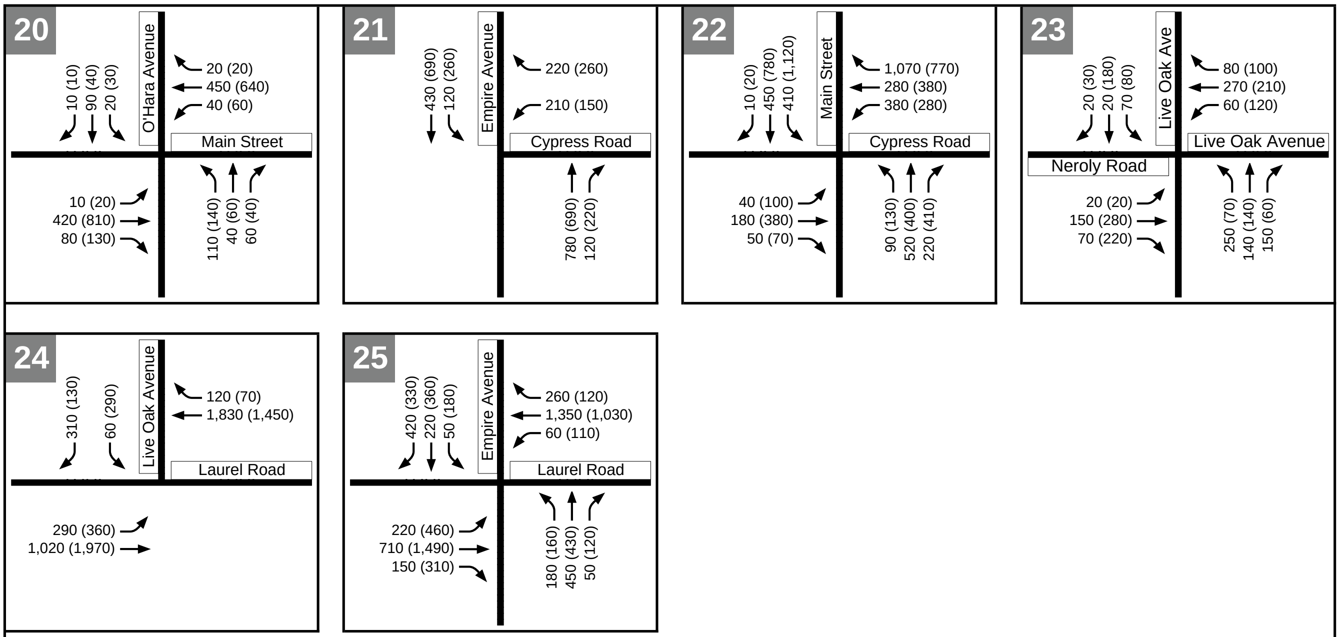
Figure 11A



KEY:

XX (YY) = AM (PM) Peak Hour Traffic Volumes

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CUMULATIVE (2030) NO PROJECT
PEAK HOUR INTERSECTION VOLUMES

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Figure 11B

TABLE 12
CUMULATIVE (2030) WITH AND WITHOUT PROJECT CONDITIONS
INTERSECTION PEAK HOUR LOS SUMMARY

Intersection	Control[1]	Peak Hour	CUMULATIVE NO PROJECT				CUMULATIVE WITH PROJECT			
			CCTALOS		HCM		CCTALOS		HCM	
			V/C Ratio[2]	LOS	Delay[3]	LOS	V/C Ratio[2]	LOS	Delay[3]	LOS
1. Wilbur Avenue/Minaker Drive	Signal	AM	0.35	A	11	B	0.35	A	11	B
		PM	0.38	A	9	A	0.39	A	9	A
2. Wilbur Avenue/Viera Avenue	SSSC	AM	--	--	3 (26)	A (D)	--	--	3 (29)	A (D)
		PM	--	--	2 **(37)**	A **(E)**	--	--	3 **(50)**	A **(F)**
3. Wilbur Avenue/SR 160 SB Ramps	SSSC	AM	--	--	17 **(>60)**	C **(F)**	--	--	**43 (>60)**	**E (F)**
		PM	--	--	**>60 (>60)**	**F (F)**	--	--	**>60 (>60)**	**F (F**)
4. Wilbur Avenue/SR 160 NB Ramps	SSSC	AM	--	--	13 **(39)**	B **(E)**	--	--	18 **(59)**	C **(F)**
		PM	--	--	8 **(53)**	A **(F)**	--	--	12 **(>60)**	B **(F)**
5. Wilbur Avenue/Bridgehead Road	AWSC	AM	--	--	**>60**	**F**	--	--	**>60**	**F**
		PM	--	--	**41**	**E**	--	--	**>60**	**F**
6. East 18th Street/Hillcrest Avenue	Signal	AM	0.44	A	21	C	0.46	A	21	C
		PM	0.72	C	40	D	0.75	C	44	D
7. East 18th Street/Viera Avenue	Signal	AM	0.40	A	7	A	0.42	A	7	A
		PM	0.51	A	7	A	0.55	A	8	A
8. East 18th Avenue/Phillips Lane	Signal	AM	0.29	A	19	B	0.31	A	14	B
		PM	0.50	A	24	C	0.57	A	24	C
9. Main Street/SR 160 SB Ramps	Signal	AM	0.53	A	18	B	0.60	A	19	B
		PM	0.72	C	28	C	0.89	D	43	D
10. Main Street/SR 160 NB Ramps	Signal	AM	0.58	A	15	B	0.67	B	15	B
		PM	0.69	B	22	C	0.83	D	40	D
11. Main Street/Bridgehead Road/Neroly Road	Signal	AM	0.51	A	21	C	0.61	B	24	C
		PM	0.70	B	24	C	0.81	D	28	C
12. Main Street/Sandy Lane	Signal	AM	0.32	A		A	0.44	A	9	A
		PM	0.53	A	6	A	0.71	C	21	C
13. Main Street/Live Oak Avenue	Signal	AM	0.57	A	22	C	0.67	B	21	C
		PM	0.60	B	25	C	0.84	D	41	D
14. Main Street/Big Break Road	Signal	AM	0.73	C	23	C	0.79	C	25	C
		PM	0.75	C	29	C	0.86	D	33	D
15. Oakley Road/Neroly Road	AWSC	AM	--	--	**40**	**E**	--	--	**47**	**E**
		PM	--	--	**49**	**E**	--	--	**>60**	**F**
16. Oakley Road/Live Oak Avenue	AWSC	AM	--	--	27	D	--	--	**>60**	**F**
		PM	--	--	**>60**	**F**	--	--	**>60**	**F**

TABLE 12
CUMULATIVE (2030) WITH AND WITHOUT PROJECT CONDITIONS
INTERSECTION PEAK HOUR LOS SUMMARY

Intersection	**Control[1]**	**Peak Hour**	**CUMULATIVE NO PROJECT**				**CUMULATIVE WITH PROJECT**			
			CCTALOS		**HCM**		**CCTALOS**		**HCM**	
			V/C Ratio[2]	**LOS**	**Delay[3]**	**LOS**	**V/C Ratio[2]**	**LOS**	**Delay[3]**	**LOS**
17. Oakley Road/Empire Avenue	Signal	AM	0.47	A	21	C	0.52	A	23	C
		PM	0.67	B	34	C	0.78	C	47	D
18. Main Street/Empire Avenue	Signal	AM	0.58	A	24	C	0.64	B	26	C
		PM	0.87	D	49	D	**0.97**	**E**	**66**	**E**
19. Main Street/Vintage Parkway	Signal	AM	0.24	A	8	A	0.28	A	8	A
		PM	0.30	A	7	A	0.38	A	7	A
20. Main Street/O'Hara Avenue[4]	Signal	AM	0.43	A	13	B	0.51	A	13	B
		PM	0.66	B	16	B	0.81	D	25	C
21. Cypress Road/Empire Avenue	Signal	AM	0.45	A	13	B	0.49	A	15	B
		PM	0.50	A	17	B	0.58	A	19	B
22. Cypress Road/Main Street	Signal	AM	0.69	B	32	C	0.73	C	39	D
		PM	0.77	C	52	D	0.84	D	53	D
23. Neroly Road/Live Oak Avenue	AWSC	AM	--	--	31	D	--	--	**44**	**E**
		PM	--	--	24	C	--	--	**56**	**F**
24. Laurel Road/Live Oak Avenue	Signal	AM	0.56	A	15	B	0.58	A	16	B
		PM	0.58	A	15	B	0.62	B	16	B
25. Laurel Road/Empire Avenue	Signal	AM	**0.98**	**E**	**61**	**E**	**0.99**	**E**	**66**	**E**
		PM	**0.93**	**E**	**79**	**E**	**0.98**	**E**	**98**	**F**
26. Bridgehead Road/Project Driveway	N/A/Signal	AM	--	--	--	--	0.44	A	8	A
		PM	--	--	--	--	0.37	A	12	B
27. Main Street/Project Driveway Center	N/A/Signal	AM	--	--	--	--	0.40	A	3	A
		PM	--	--	--	--	0.59	A	11	B
28. Main Street/Project Driveway West	N/A/Signal	AM	--	--	--	--	0.42	A	3	A
		PM	--	--	--	--	0.55	A	7	A
29. Live Oak Avenue/Project Driveway	N/A/Signal	AM	--	--	--	--	0.31	A	10	B
		PM	--	--	--	--	0.61	B	18	B

Bold indicates intersection operating at deficient level of service.

1. Signal = Signalized intersection
   SSSC = Side-street stop-controlled intersection
   AWSC = All-way stop-controlled intersection
2. Volume-to-capacity ratio (V/C) determined for all signalized intersections using the CCTALOS methodology.
3. Average intersection delay is calculated for all signalized and unsignalized intersections using the 2000 *Highway Capacity Manual* (HCM) methods. For side-street stop-controlled intersections, average intersection delay (in seconds per vehicle) is presented. Delay for worst approach is shown in brackets.

Source: Fehr & Peers, 2006.

#2 The stop-controlled northbound approach at the side-street stop-controlled Wilbur Avenue/Vierra Avenue intersection would operate at LOS E (delay = 37 seconds) during the PM peak hour. However, the intersection volumes would not satisfy the MUTCD peak hour signal warrant.

#3 The stop-controlled southbound approach at the side-street stop-controlled Wilbur Avenue/SR 160 southbound ramps intersection would operate at LOS F (delay > 60 seconds) during both AM and PM peak hour, and the intersection would satisfy the MUTCD peak hour signal warrant.

#4 The stop-controlled northbound approach at the side-street stop-controlled Wilbur Avenue/SR 160 northbound ramps intersection would operate at LOS E (delay = 39 seconds) during the AM peak hour and LOS F (delay = 53 seconds) during the PM peak hour. The intersection would satisfy the MUTCD peak hour signal warrant.

#5 The all-way stop-controlled Wilbur Avenue/Bridgehead Road intersection would operate at LOS F (delay > 60 seconds) during the AM peak hour and LOS E (delay = 41 seconds) during the PM peak hour. The intersection would satisfy the MUTCD peak hour signal warrant.

#15 The all-way stop-controlled Oakley Road/Neroly Road intersection would operate at LOS E during both AM and PM peak hours (delay = 40 seconds during the AM peak hour and delay = 49 seconds during the PM peak hour). The intersection would satisfy the MUTCD peak hour signal warrant.

#16 The all-way stop-controlled Oakley Road/Live Oak Avenue intersection would operate at LOS F (delay > 60 seconds) during the PM peak hour and would satisfy the MUTCD peak hour signal warrant.

#25 The signalized Laurel Road/Empire Avenue intersection would operate at LOS E during both AM and PM peak hours (v/c = 0.98 and delay = 61 seconds during the AM peak hour and v/c = 0.93 and delay = 79 seconds during the PM peak hour).

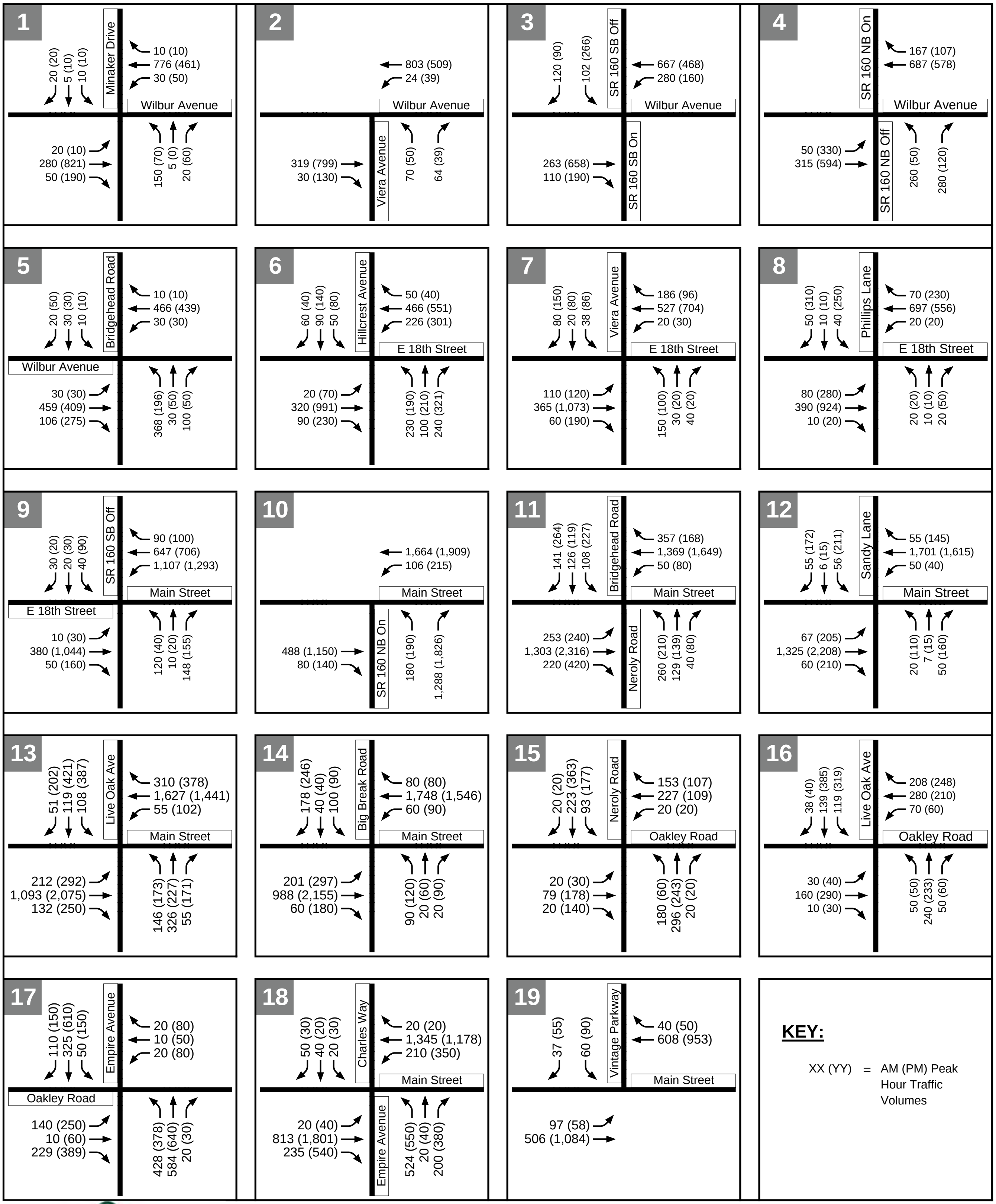
CUMULATIVE WITH PROJECT CONDITIONS

The AM and PM peak hour traffic volumes generated by the project and described in Chapter 3 were added to the Cumulative No Project conditions traffic volumes to estimate the Cumulative With Project volumes. The AM and PM peak hour traffic volumes are shown on Figure 12.

As previously mentioned, Live Oak Avenue would be extended north from Main Street over the BNSF railroad tracks to Wilbur Avenue. The proposed project would take additional access on Live Oak Avenue. The analysis assumes that the access point on Live Oak Avenue would be signalized as part of the project (see Chapter 6 for project access analysis). Due to their proximity to each other, signal timing and phasing at the Live Oak Avenue/ Project Driveway and Main Street/Live Oak Avenue intersections will be coordinated.

Table 12 summarizes the intersection LOS analysis results of the Cumulative With Project conditions. Appendix B contains the LOS calculation worksheets. Based on thresholds presented in Table 3, the following study intersections would continue to operate at unacceptable service levels under Cumulative With Project conditions. These intersections would operate at unacceptable service levels regardless of the proposed project. However, the proposed project would contribute to the unacceptable service levels:

#2 The stop-controlled northbound approach at the side-street stop-controlled Wilbur Avenue/Vierra Avenue intersection would operate at LOS F (delay = 50 seconds) during the PM peak hour. However, the intersection volumes would not satisfy the MUTCD peak hour signal warrant. Thus, the proposed project would not cause a significant impact at this intersection under Cumulative With Project conditions.



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CUMULATIVE (2030) WITH PROJECT PEAK HOUR INTERSECTION VOLUMES

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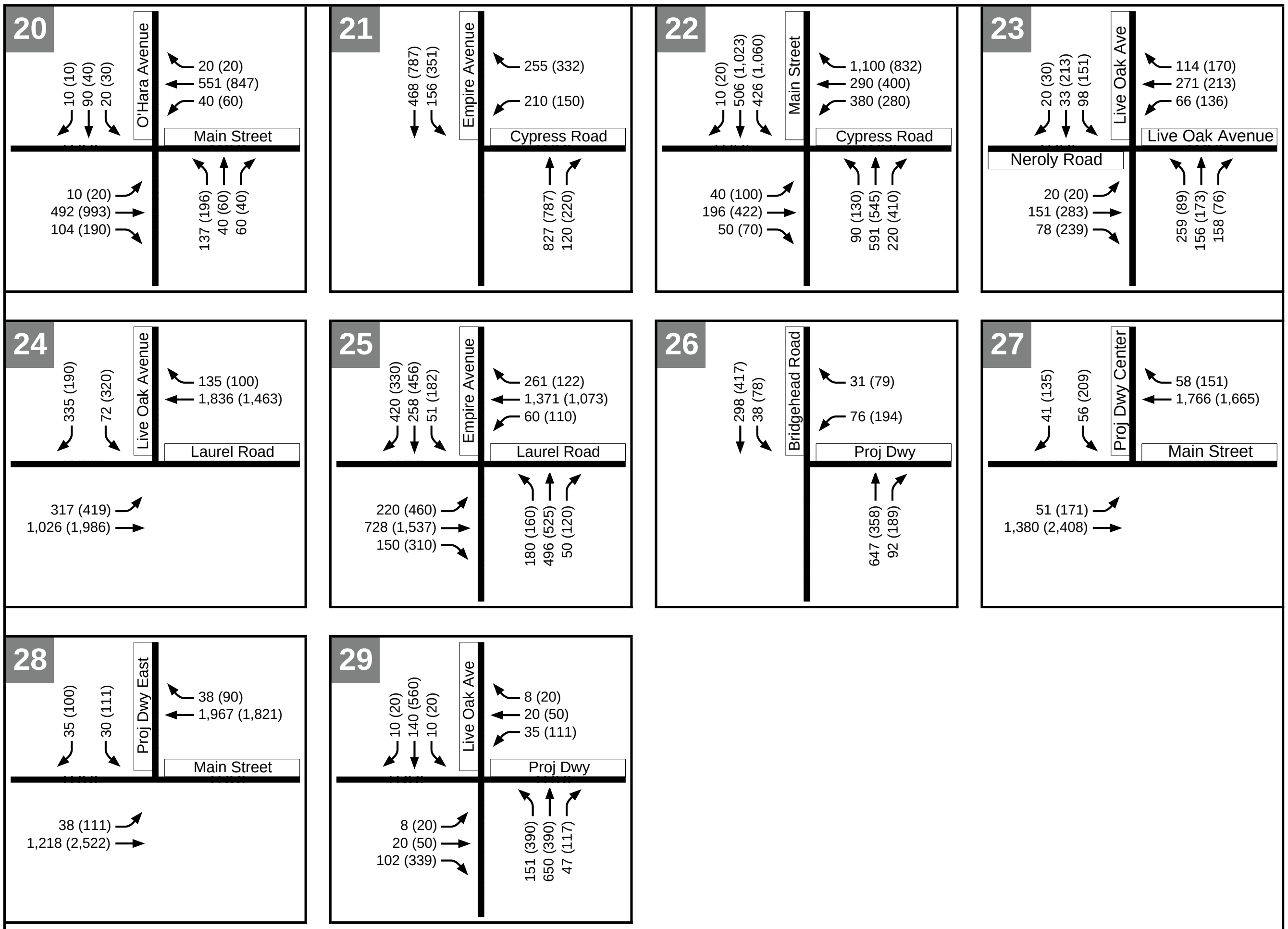
Figure 12A



KEY:

XX (YY) = AM (PM) Peak Hour Traffic Volumes

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Cline Specific Plan

CUMULATIVE (2030) WITH PROJECT PEAK HOUR INTERSECTION VOLUMES

Figure 12B

#3 The stop-controlled southbound approach at the side-street stop-controlled Wilbur Avenue/SR 160 southbound ramps intersection would operate at LOS F (delay > 60 seconds) during both AM and PM peak hour, and the intersection would satisfy the MUTCD peak hour signal warrant.

#4 The stop-controlled northbound approach at the side-street stop-controlled Wilbur Avenue/SR 160 northbound ramps intersection would operate at LOS F during both AM and PM peak hours (delay = 59 seconds during the AM peak hour and delay > 60 seconds during the PM peak hour). The intersection would satisfy the MUTCD peak hour signal warrant.

#5 The all-way stop-controlled Wilbur Avenue/Bridgehead Road intersection would operate at LOS F (delay > 60 seconds) during both AM and PM peak hours. The intersection would satisfy the MUTCD peak hour signal warrant.

#15 The all-way stop-controlled Oakley Road/Neroly Road intersection would operate at LOS E (delay = 47 seconds) during the AM peak hour and LOS F (delay > 60 seconds) during the PM peak hour. The intersection would satisfy the MUTCD peak hour signal warrant.

#16 The all-way stop-controlled Oakley Road/Live Oak Avenue intersection would operate at LOS F (delay > 60 seconds) during both AM and PM peak hours and would satisfy the MUTCD peak hour signal warrant.

#25 The signalized Laurel Road/Empire Avenue intersection would operate at unacceptable LOS during both AM and PM peak hours (intersection would operate at LOS E during both peak hours [v/c = 0.99 during AM peak hour and v/c= 0.98 during the PM peak hour] based on CCTALOS; and it would operate at LOS E [delay = 66 seconds] during the AM peak hour and LOS F [delay = 98 seconds] during the PM peak hour based on HCM).

The following intersections would operate at acceptable service levels under Cumulative No Project conditions. The addition of project would cause the LOS at these intersections to decline to an unacceptable level:

#18 The signalized Main Street/Empire Avenue intersection would operate at unacceptable LOS E during the PM peak hour (v/c = 0.97 and delay = 66 seconds based on HCM).

#23 The all-way stop-controlled Neroly Road/Live Oak Avenue intersection would operate at LOS E (delay = 44 seconds) during the AM peak hour and LOS F (delay = 56 seconds) during the PM peak hours. The intersection would satisfy the MUTCD peak hour signal warrant.

The Main Street/Northbound SR 160 Ramps intersection (#10) would operate at acceptable LOS D (v/c = 0.83, and delay = 40 seconds) during the PM peak hour under Cumulative With Project conditions. As indicated in previous analysis (*Main Street Widening Project Final Traffic Analysis Report*, August 2006) and confirmed by this analysis, queues on the SR 160 northbound off-ramp are forecast to spill back onto the freeway during portions of the PM peak hour by the year 2030. However, based on the significance criteria used for this analysis, the queue spill back is not considered a significant impact. As stated in the *Main Street Widening Project Final Traffic Analysis Report,* improvement options, such as reconfiguring the interchange or lengthening the off-ramp, may reduce the expected congestion on the SR 160 northbound off-ramp. Although no interchange improvements have yet been identified, City of Oakley is committed to working with City of Antioch and Caltrans to study options that would address traffic operations issues at the Main Street Interchange.

CUMULATIVE INTERSECTION IMPACTS AND MITIGATIONS

Based on the application of the significance criteria presented in Chapter 1, eight significant impacts were identified. These impacts and mitigation are described below.

IMPACT 4: The addition of project traffic to side-street stop-controlled Wilbur Avenue/SR 160 southbound ramps intersection (#3) would contribute to the unacceptable LOS F conditions during the PM peak hour. The forecasted PM peak hour intersection volumes would also satisfy the MUTCD peak hour signal warrant. This is a significant impact under Cumulative With Project conditions because the proposed project would contribute to the unacceptable LOS at the intersection.

ANALYSIS: The stop-controlled southbound approach of the intersection would operate at unacceptable LOS F (delay > 60 seconds) during the PM peak hour regardless of the proposed project. The proposed project would contribute to the unacceptable conditions by adding traffic to the intersection.

MITIGATION MEASURE 4: Mitigation of the unacceptable conditions at the Wilbur Avenue/SR 160 southbound ramps intersection shall be achieved by signalizing the intersection[4]. Due to its proximity to the Wilbur Avenue/SR 160 northbound ramps and Wilbur Avenue/Bridgehead Road intersections, the three intersections shall be signalized at the same time and signal timings and phasings shall be coordinated. The intersection is located in the City of Antioch, and this improvement is not included in a funding document. The project shall contribute to this mitigation by paying its fair share of the cost as determined by the Cities of Antioch and Oakley.

The Wilbur Avenue/SR 160 southbound ramps intersection would operate at acceptable LOS C (v/c = 0.74 and delay = 29 seconds) during the PM peak hour with implementation of this mitigation measure. Analysis using traffic simulation software indicates that if signal timing and phasing at this intersection are coordinated with the recommended signals at Wilbur Avenue/SR 160 northbound ramps and Wilbur Avenue/ Bridgehead Road intersections (see Mitigations 5 and 6), the three intersections as a system would operate at acceptable LOS and queues would not spill back. This impact would be reduced to a ***less-than-significant*** level with the implementation of this mitigation measure.

IMPACT 5: The addition of project traffic to side-street stop-controlled Wilbur Avenue/SR 160 northbound ramps intersection (#4) would contribute to the unacceptable LOS F conditions during both AM and PM peak hours. The forecasted AM and PM peak hour intersection volumes would also satisfy the MUTCD peak hour signal warrant. This is a significant impact under Cumulative With Project conditions because the proposed project would contribute to the unacceptable LOS at the intersection.

ANALYSIS: The stop-controlled northbound approach of the intersection would operate at unacceptable LOS E (delay = 39 seconds) during the AM peak hour and LOS F (delay = 53 seconds) during the PM peak hour under Cumulative No Project conditions. The proposed project would contribute to the unacceptable conditions by adding traffic to the intersection and cause the intersection to operate at unacceptable LOS F (delay > 60 seconds) during both AM and PM peak hours.

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[4] See Footnote 2.

MITIGATION MEASURE 5:	Mitigation of the unacceptable conditions at the Wilbur Avenue/SR 160 northbound ramps intersection shall be achieved by signalizing the intersection[5]. Due to its proximity to the Wilbur Avenue/SR 160 southbound ramps and Wilbur Avenue/Bridgehead Road intersections, the three intersections shall be signalized at the same time and signal timings and phasings shall be coordinated. The intersection is located in the City of Antioch, and this improvement is not included in a funding document. The project shall contribute to this mitigation by paying its fair share of the cost as determined by the Cities of Antioch and Oakley.

The Wilbur Avenue/SR 160 northbound ramps intersection would operate at acceptable LOS during both AM and PM peak hours (the intersection would operate at LOS A [v/c = 0.44 during the AM peak hour and v/c = 0.46 during the PM peak hour] based on CCTALOS and would operate at LOS B [delay = 12 seconds during the AM peak hour and delay = 15 seconds during the PM peak hour] based on HCM) with implementation of this mitigation measure. Analysis using traffic simulation software indicates that if signal timing and phasing at this intersection are coordinated with the recommended signals at Wilbur Avenue/SR 160 southbound ramps and Wilbur Avenue/Bridgehead Road intersections (see Mitigations 4 and 6), the three intersections as a system would operate at acceptable LOS and queues would not spill back from any of the three intersections. This impact would be reduced to a ***less-than-significant*** level with the implementation of this mitigation measure.

IMPACT 6:	The addition of project traffic to all-way stop-controlled Wilbur Avenue/ Bridgehead Road intersection (#5) would contribute to the unacceptable LOS F conditions during the AM peak hour and cause the intersection to operate at LOS F during the PM peak hour. The forecasted AM and PM peak hour intersection volumes would also satisfy the MUTCD peak hour signal warrant. This is a significant impact under Cumulative With Project conditions because the proposed project would contribute to the unacceptable LOS at the intersection.
ANALYSIS:	The all-way stop-controlled intersection would operate at unacceptable LOS F (delay > 60 seconds) during the AM peak hour and LOS E (delay = 41 seconds) during the PM peak hour under Cumulative No Project conditions. The proposed project would contribute to the unacceptable conditions by adding additional traffic to the intersection and causing the intersection to operate at unacceptable LOS F (delay > 60 seconds) during both AM and PM peak hours
MITIGATION MEASURE 6:	Mitigation of the unacceptable conditions at the Wilbur Avenue/Bridgehead Road intersection shall be achieved by signalizing the intersection[6] and providing exclusive left-turn lanes on the northbound and westbound approaches. Due to its proximity to the Wilbur Avenue/SR 160 northbound ramps and Wilbur Avenue/ SR 160 southbound ramps intersections, the three intersections shall be signalized at the same time and signal timings and phasing shall be coordinated. The installation of a signal at the Wilbur Avenue/Bridgehead Road intersection is included in the City's Transportation Impact Fee Program. The project shall

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[5] See Footnote 2.

[6] See Footnote 2.

contribute to this mitigation by paying its fair share of the cost through the payment of the City's Transportation Impact Fee.

The Wilbur Avenue/Bridgehead Road intersection would operate at acceptable LOS during both AM and PM peak hours (the intersection would operate at LOS B [v/c = 0.62 during the AM peak hour and v/c = 0.61 during the PM peak hour] based on CCTALOS and would operate at LOS C [delay = 26 seconds during the AM peak hour and delay = 20 seconds during the PM peak hours] based on HCM) with implementation of this mitigation measure. Analysis using traffic simulation software indicates that if signal timing and phasing at this intersection are coordinated with the recommended signals at Wilbur Avenue/SR 160 northbound ramps and Wilbur Avenue/SR 160 southbound ramps intersections (see Mitigations 4 and 5), the three intersections as a system would operate at acceptable LOS and queues would not spill back. This impact would be reduced to a ***less-than-significant*** level with the implementation of this mitigation measure.

IMPACT 7: The addition of project traffic to the all-way stop-controlled Oakley Road/Neroly Road intersection (#15) would contribute to unacceptable LOS E conditions during the AM peak hour and cause the intersection to operate at unacceptable LOS F during the PM peak hour. The forecasted AM and PM peak hour intersection volumes would also satisfy the MUTCD peak hour signal warrant. This is a significant impact under Cumulative With Project conditions because the proposed project would contribute to the unacceptable LOS at the intersection.

ANALYSIS: The intersection would operate at unacceptable LOS E during both AM and PM peak hours (delay = 40 seconds during the AM peak hour and delay = 49 seconds during the PM peak hour) under Cumulative No Project conditions. The proposed project would contribute to unacceptable LOS E (delay = 47 seconds) during the AM peak hour and cause the intersection to operate at unacceptable LOS F (delay > 60 seconds) during the PM peak hour. The intersection would operate at a deficient level regardless of the proposed project. The proposed project would result in a further decline in an already unacceptable LOS at the intersection by adding traffic to the northbound and southbound approaches of the intersection.

MITIGATION MEASURE 7: Mitigation of the unacceptable conditions at the Oakley Road/Neroly Road intersection shall be achieved by signalizing the intersection and providing exclusive left-turn lanes on all approaches[7]. The installation of a signal at the Oakley Road/Neroly Road intersection is included in the City's Transportation Impact Fee Program. The project shall contribute to this mitigation by paying its fair share of the cost through the payment of the City's Transportation Impact Fee.

The Oakley Road/Neroly Road intersection would operate at acceptable service level (LOS A [v/c = 0.50 during the AM peak hour and v/c = 0.47 during the PM peak hour] based on CCTALOS and LOS C [delay = 25 seconds during the AM peak hour and delay = 29 seconds during the PM peak hour] based on HCM) with implementation of this mitigation measure. This impact would be reduced to a ***less-than-significant*** level with the implementation of this mitigation measure.

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[7] See Footnote 2.

IMPACT 8: The addition of project traffic would cause the all-way stop-controlled Oakley Road/Live Oak Avenue intersection (#16) to operate at unacceptable LOS F during the AM peak hour and contribute to unacceptable LOS F conditions during the PM peak hour. The forecasted AM and PM peak hour intersection volumes would also satisfy the MUTCD peak hour signal warrant. This is a significant impact under Cumulative With Project conditions because the proposed project would contribute to the unacceptable LOS at the intersection.

ANALYSIS: The intersection would operate at acceptable LOS D (delay = 27 seconds) during the AM peak hour and unacceptable LOS F (delay > 60 seconds) during the PM peak hour under Cumulative No Project conditions. The proposed project would cause the intersection to operate at unacceptable LOS F (delay > 60 seconds) during the AM peak hour and contribute to LOS F (delay > 60 seconds) conditions during the PM peak hour. The intersection would operate at a deficient level regardless of the proposed project. The proposed project would result in a further decline in an already unacceptable LOS at this intersection by adding traffic to the northbound and southbound approaches of the intersection.

***MITIGATION MEASURE 8*:** Mitigation of the unacceptable conditions at the Oakley Road/Live Oak Avenue intersection shall be achieved by implementing Mitigation Measure 2.

The Oakley Road/Live Oak Avenue intersection would operate at acceptable service level (LOS A [v/c = 0.56] based on CCTALOS and LOS C [delay = 25 seconds] based on HCM during the AM peak hour; and LOS B [v/c = 0.67] based on CCTALOS and LOS D [delay = 40 seconds] based on HCM during the PM peak hour) with implementation of this mitigation measure. This impact would be reduced to a ***less-than-significant*** level with the implementation of this mitigation measure.

IMPACT 9: The addition of project traffic would cause the signalized Main Street/Empire Avenue intersection (#18) to operate at unacceptable LOS E during the PM peak hour, causing a significant impact under Cumulative With Project conditions.

ANALYSIS: The intersection would operate at acceptable LOS D (v/c = 0.87 and delay = 49 seconds) during the PM peak hour under Cumulative No Project conditions. The proposed project would cause the intersection to operate at an unacceptable LOS E (v/c = 0.97 and delay = 66 seconds) during the PM peak hour. The intersection would operate at a deficient level due to project traffic added to northbound left, westbound through, and eastbound through and right movements at the intersection.

***MITIGATION MEASURE 9*:** Mitigation of the unacceptable conditions at Main Street/Empire Avenue intersection shall be achieved by:

- Adding a second exclusive left-turn lane on the westbound approach of the intersection;
- Converting the exclusive southbound right-turn lane at the Oakley Road/ Empire Avenue intersection to a shared through/right-turn lane; and

- Coordinating signal phasing and timing at the Main Street/Empire Avenue and Oakley Road/Empire Avenue intersections.

The widening of Main Street at Empire Avenue is included in the City's Transportation Impact Fee Program. The coordination of signals at Main Street/ Empire Avenue and Oakley Road/Empire Avenue intersections is not included in any funding documents. The project shall contribute to this mitigation by paying its fair share of the cost through the payment of the City's Transportation Impact Fee, and any additional fees as determined by City of Oakley.

Considering the close spacing on Empire Avenue between Main Street and Oakley Road, signal timing and phasing at the two intersections should be coordinated to minimize queue spillbacks at either intersection. Currently southbound Empire Avenue at Oakley Road provides one exclusive right-turn lane and one through lane. This configuration would not accommodate the proposed dual left-turn from westbound Main Street to southbound Empire Avenue. The exclusive right-turn lane on southbound Empire Avenue at Oakley Road should be converted to a shared through/right-turn lane to accommodate the additional traffic. Analysis using traffic simulation software indicates that with implementation of these improvements, both intersections would operate at acceptable LOS and queues would not spill back from either intersection.

The Main Street/Empire Avenue intersection would operate at LOS D (v/c = 0.88 and delay = 43 seconds) during the PM peak hour with implementation of this mitigation measure. This impact would be reduced to a ***less-than-significant*** level with the implementation of this mitigation measure. Traffic operations at the Oakley Road/ Empire Avenue intersection (#17) would also improve with the implementation of this mitigation measure.

IMPACT 10: The addition of project traffic would cause the all-way stop-controlled Neroly Road/Live Oak Avenue intersection (#23) to operate at unacceptable LOS E during the AM peak hour and LOS F during the PM peak hour. The forecasted AM and PM peak hour intersection volumes would also satisfy the MUTCD peak hour signal warrant. This is a significant impact under Cumulative With Project conditions.

ANALYSIS: The intersection would operate at acceptable LOS D (delay = 31 seconds) during the AM peak hour and LOS C (delay = 24 seconds) during the PM peak hour under Cumulative No Project conditions. The proposed project would cause the intersection to operate at unacceptable LOS E (delay = 44 seconds) during the AM peak hour and LOS F (delay = 56 seconds) during the PM peak hour. The intersection would operate at a deficient level due to project traffic added to the southbound through and left-turn, northbound through, and westbound right-turn movements.

MITIGATION MEASURE 10: Mitigation of the unacceptable conditions at the Neroly Road/Live Oak Avenue intersection shall be achieved by implementing Mitigation Measure 3.

The Neroly Road/Live Oak Avenue intersection would operate at acceptable LOS (LOS A [v/c = 0.46 during the AM peak hour and v/c = 0.56 during the PM peak hour] based on CCTALOS and LOS C [delay = 27 seconds during both AM and PM peak hours] based on HCM) with implementation of this mitigation measure. This impact would be reduced to a ***less-than-significant*** level with the implementation of this mitigation measure.

IMPACT 11:	The addition of project traffic to the signalized Laurel Road/Empire Avenue intersection (#25) would contribute to the unacceptable LOS E conditions during the AM peak hour and cause the intersection to operate at LOS F during the PM peak hour.
ANALYSIS:	The intersection would operate at an unacceptable LOS E during both AM and PM peak hours under Cumulative No Project conditions (v/c = 0.98 and delay = 61 seconds during the AM peak hour, and v/c = 0.93 and delay = 79 seconds during the PM peak hour). The intersection would continue to operate at unacceptable conditions with the addition of project generated traffic (LOS E during the AM peak hour [v/c = 0.99 and delay = 66], and LOS E [v/c =0.98] based on CCTALOS and LOS F [delay = 98 seconds] based on HCM.) The project would further contribute to the poor intersection operations by adding traffic to the northbound and southbound approaches of the intersection.
MITIGATION MEASURE 11:	Mitigation of the unacceptable conditions at Laurel Road/Empire Avenue intersection shall be achieved by adding a second exclusive left-turn lane and one exclusive right-turn lane on the eastbound approach and adding an exclusive right-turn lane on the southbound approach. This improvement is not included in any funding document. The project shall contribute to this mitigation by paying its fair share of the cost as determined by City of Oakley.

Although this mitigation measure is not included in any funding document, it is consistent with the findings of the *East Cypress Corridor Specific Plan Draft EIR* (August 2005). The Laurel Road/Empire Avenue intersection would operate at LOS D during both AM and PM peak hours (v/c = 0.86 and delay = 55 seconds during the AM peak hour; and v/c = 0.84 and delay = 51 seconds during the PM peak hour) with implementation of this mitigation measure. This impact would be reduced to a ***less-than-significant*** level with the implementation of this mitigation measure.

CUMULATIVE WITH PROJECT MITIGATED CONDITIONS

All study intersections would operate at acceptable conditions with the implementation of the recommended mitigation measures outlined in the previous section. Table 13 summarizes the intersection LOS at the study intersection after the implementation of these recommended improvements.

CUMULATIVE CONDITIONS FREEWAY OPERATIONS ANALYSIS

Table 14 summarizes the freeway delay index analysis results under Cumulative No Project and Cumulative With Project conditions. Based on the analysis, the study freeway segments would satisfy their established TSO.

TABLE 13
MITIGATED CUMULATIVE (2030) WITH PROJECT CONDITIONS
INTERSECTION PEAK HOUR LOS SUMMARY

			CUMULATIVE WITH PROJECT				CUMULATIVE WITH PROJECT MITIGATED			
			CCTALOS		HCM		CCTALOS		HCM	
Study Intersection	**Control[1]**	**Peak Hour**	**V/C Ratio[2]**	**LOS**	**Delay[3]**	**LOS**	**V/C Ratio[2]**	**LOS**	**Delay[3]**	**LOS**
3. Wilbur Avenue/SR 160 SB Ramps	SSSC/ Signal	AM	--	--	**43 (>60)**	**E (F)**	0.45	A	14	B
		PM	--	--	**>60 (>60)**	**F (F)**	0.74	C	29	C
4. Wilbur Avenue/SR 160 NB Ramps	SSSC/ Signal	AM	--	--	18 **(59)**	C **(F)**	0.44	A	12	B
		PM	--	--	12**(>60)**	B **(F)**	0.46	A	15	B
5. Wilbur Avenue/Bridgehead Road	AWSC/ Signal	AM	--	--	**>60**	**F**	0.62	B	26	C
		PM	--	--	**>60**	**F**	0.61	B	20	C
15. Oakley Road/Neroly Road	AWSC/ Signal	AM	--	--	**47**	**E**	0.50	A	25	C
		PM	--	--	**>60**	**F**	0.47	A	29	C
16. Oakley Road/Live Oak Avenue	AWSC/ Signal	AM	--	--	**>60**	**F**	0.56	A	25	C
		PM	--	--	**>60**	**F**	0.67	B	40	D
17. Oakley Road/Empire Avenue	Signal	AM	0.52	A	23	C	0.46	A	19	B
		PM	0.78	C	47	D	0.64	B	41	D
18. Main Street/Empire Avenue	Signal	AM	0.64	B	26	C	0.64	B	23	C
		PM	**0.97**	**E**	**66**	**E**	0.88	D	43	D
23. Neroly Road/Live Oak Avenue	AWSC/ Signal	AM	--	--	**44**	**E**	0.46	A	27	C
		PM	--	--	**56**	**F**	0.56	A	27	C
25. Laurel Road/Empire Avenue	Signal	AM	**0.99**	**E**	**66**	**E**	0.86	D	55	D
		PM	**0.98**	**E**	**98**	**F**	0.84	D	51	D

Bold indicates intersection operating at deficient level of service.

1. Signal = Signalized intersection
   SSSC = Side-street stop-controlled intersection
   AWSC = All-way stop-controlled intersection
2. Volume-to-capacity ratio (V/C) determined for all signalized intersections using the CCTALOS methodology.
3. Average intersection delay is calculated for all signalized and unsignalized intersections using the 2000 *Highway Capacity Manual* (HCM) methods. For side-street stop-controlled intersections, average intersection delay (in seconds per vehicle) is presented. Delay for worst approach is shown in brackets.

Source: Fehr & Peers, 2006.

TABLE 14
CUMULATIVE (YEAR 2030) WITH AND WITHOUT PROJECT CONDITIONS
FREEWAY DELAY INDEX SUMMARY

Freeway Segment	Peak Hour	TSO[1]	Cumulative No Project		Cumulative With Project	
			EB or NB[2]	WB or SB[3]	EB or NB[2]	WB or SB[3]
SR 4 between Hillcrest Avenue and SR 160/SR 4 Bypass	AM PM	2.5 2.5	1.0 1.1	1.3 1.0	1.0 1.1	1.4 1.1
SR 160 between SR 4/SR 4 Bypass and Main Street	AM PM	2.5 2.5	1.0 1.1	1.2 1.1	1.1 1.2	1.3 1.2
SR 160 between Main Street and Wilbur Avenue	AM PM	2.0 2.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0
SR 160 between Wilbur Avenue and Antioch Bridge Toll Plaza	AM PM	2.0 2.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0
SR 4 Bypass between SR 4/SR 160 and Laurel Road	AM PM	2.0 2.0	1.4 1.0	1.0 1.2	1.4 1.0	1.0 1.2
SR 4 Bypass between Laurel Road and Lone Tree Way	AM PM	2.0 2.0	1.2 1.0	1.0 1.5	1.3 1.0	1.0 1.6

Results in **bold** represent freeway segments exceeding established TSO

1. TSO as established by CCTA.
2. Delay index in the eastbound or northbound directions.
3. Delay index in the westbound or southbound directions.

Source: Fehr & Peers, 2006.

6. SITE ACCESS, ON-SITE CIRCULATION, AND PARKING

This chapter evaluates site access and on-site circulation for vehicles, pedestrians, bicycles, transit, and emergency vehicles. Parking supply at the site is also analyzed. This evaluation is based on the preliminary site plan dated September 2006 and shown on Figure 2.

SITE ACCESS AND ON-SITE CIRCULATION

Site access and circulation for vehicles, pedestrians, bicycles, transit, emergency access, and truck is discussed in this section.

Vehicles

As shown on Figure 2, the site would be accessible from Bridgehead Road and Main Street in the near-term, and Live Oak Avenue after the completion of the Live Oak Avenue extension. The project would ultimately be served by five signalized full access (accommodating all movements in and out of the site) points. These access points are located on Bridgehead Road north of Main Street, on Main Street opposite Sandy Lane, on Main Street between Sandy Lane and Live Oak Avenue, on Main Street east of Live Oak Avenue, and on Live Oak Avenue north of Main Street. Currently, Live Oak Avenue terminates at Main Street. In the long-term, Live Oak Avenue would be extended north from Main Street, over the BNSF Railroad line, and connect with the Wilbur Avenue extension. In the interim period, Live Oak Avenue would be constructed within the project site to provide access to and from the site.

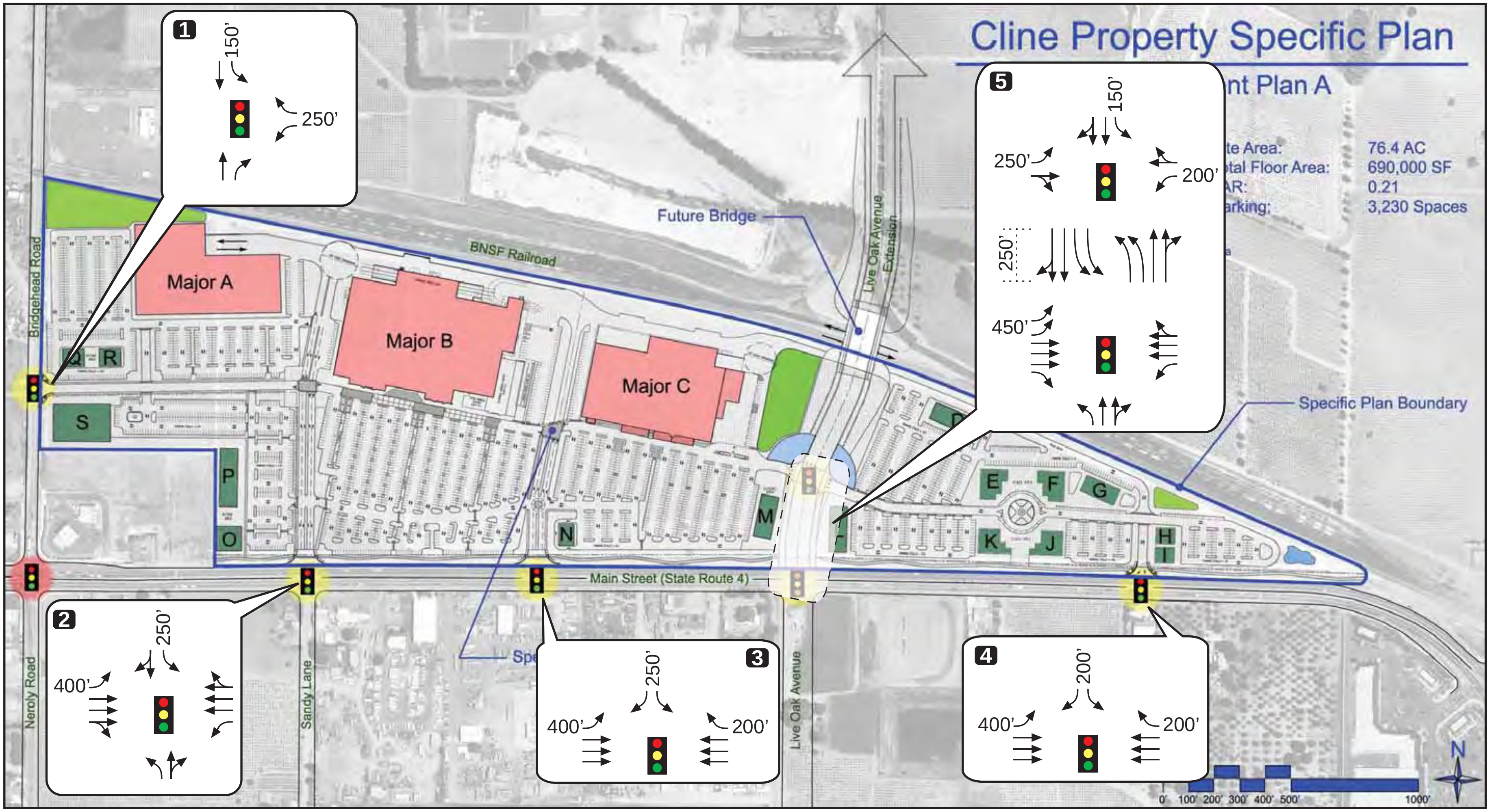
An internal east-west roadway is proposed to extend the length of the site and would typically run through the center of the site. It would intersect the Live Oak Avenue extension just south of the incline for the Live Oak Avenue overpass, about 300 feet north of Main Street and connect the two parts of the site divided by the proposed Live Oak Avenue extension.

A preliminary traffic simulation of the project driveways and the roadways adjacent to the project site was conducted to determine the adequacy of the access points and the needed geometry. Figure 13 provides the recommended configuration of the project access points, including the number of required lanes and storage lengths based on the site plan dated September 2006 and shown on Figure 2. These recommendations should be verified when the site plan is finalized.

Pedestrian and Bicycle

Class II bicycle lanes and sidewalks will be added to Main Street as part of the Main Street widening project. In addition, sidewalks will also be constructed on Bridgehead Road and Live Oak Avenue extension. These improvements would provide pedestrian and bicycle access to the site. However, the current site plan does not show how bicycles and pedestrians would access the project components from the surrounding roadway networks. The project site plan should be designed with clear connections that minimize potential interaction between vehicles with pedestrians and bicycles.

The proposed site layout will result in high pedestrian volumes crossing the major internal roadway between the major retailers and parking areas. The internal roadway should be designed with traffic calming features to keep vehicle speeds slow, such as speed humps or pavement treatments, and pedestrian enhancements, such as sidewalk curb extensions, raised crosswalks, and pedestrian-scale lighting.



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RECOMMENDED INTERSECTION CONFIGURATION FOR PROJECT ACCESS POINTS

May 2007
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Figure 13

Transit Access

Tri-Delta Transit operates several bus routes on Main Street adjacent to the project site. The project applicant should coordinate with Tri-Delta Transit to provide bus pullouts and appropriate bus amenities such as shelters on Main Street. Pedestrian facilities providing connections between the bus stops and the major retailers on-site should also be provided.

Emergency Access

Factors such as number of access points, roadway width, and proximity to fire stations determine if a site provides sufficient emergency access. The proposed project provides multiple points of entry from adjacent roadways. If one of these roadways is blocked or obstructed, an emergency vehicle could use an alternate route to access the site. The internal project roadways with adjacent parking should have minimum lane widths of 24 feet to provide adequate width for emergency vehicle access. The project site is located in the East Contra Costa Fire Protection District and the nearest fire station is located on Second Street, south of Main Street, about two miles from the project site. The proximity of the fire station would allow for timely emergency response to the project site. Given these considerations, the project would provide sufficient emergency access.

Truck Access and Circulation

The proposed project would consist of large and small retailers. Regular deliveries in both large semi-trucks, and smaller delivery vehicles would be expected. To the extent possible, large semi-truck deliveries should be scheduled for off-peak periods to minimize conflicts between delivery trucks and passenger vehicles. Truck bays for the major retail pads are located in the back of site, adjacent to the railroad right-of-way. Although not identified on the site plan, truck access to these bays would most likely be provided through the eastern driveway on Main Street. Truck routes should be identified through the site and internal intersection and drive aisles should be designed to accommodate the turning radii of large delivery vehicles.

PARKING

Based on the City's Zoning Ordinance, the site must provide four parking spaces per 1,000 square feet of space. At buildout, the 770,000 square feet site must provide 3,080 parking spaces.

The proposed site would consist of up to 740,000 square feet of retail uses and 75 hotel rooms. Table 15 summarizes the parking demand estimated using the demand rates developed by the Urban Land Institute (ULI), and the recommended parking supply for the proposed site. ULI in *Parking Requirements for Shopping Centers* (2nd Edition, 1999) and *Shared Parking* (2nd Edition, 2005) recommends using a parking demand rate of 4.5 spaces per thousand square feet of gross leasable area to estimate the parking demand for shopping centers of this type. This demand rate is applicable to shopping centers with more than 600,000 square feet of retail space where less than 10 percent of the gross leasable space is for dining uses. This recommendation is based on parking accumulation data collected at various shopping centers throughout the country and represents parking demand at the 20th highest hour in the year. Larger shopping centers generate more parking demand because of longer shopping duration by customers. The ULI recommended parking demand rate assures that a shopping center would provide adequate parking supply during most of the year, however vehicles would need to circulate and wait for available parking spaces during the busiest times of the December holiday season. We also recommend using an occupancy factor of 95 percent to minimize vehicle circulation within the site.

TABLE 15
ESTIMATED PARKING DEMAND AND SUPPLY

Land Use	Size	Demand Rate[1]	Demand	Occupancy Factor	Recommended Supply
Shopping Center	740,000 square feet	4.5 per KSF	3,330	95%	3,505
Hotel	75 rooms	1.25 per room	94	95%	99
Total			***3,424***		***3,604***

1. Based on parking demand rates published by ULI in *Parking Requirements for Shopping Centers* (2nd Edition, 1999) and *Shared Parking* (2nd Edition, 2005).

Source: ULI, Fehr & Peers, 2006.

ULI also recommends using a parking demand rate of 1.25 spaces per room for hotels. A minimum occupancy factor of 95 percent is also used to determine the parking supply for the hotel component of the site.

As summarized in Table 15, at maximum buildout, the proposed project is estimated to generate a peak parking demand of 3,424 parking spaces. It is recommended that the site provide a parking supply of 3,604 spaces, at this maximum floor space level, to accommodate the estimated parking demand and minimize vehicles circulating to search for available parking spaces.

All parking spaces should be conveniently located and accessible to all users. The current site plan has balanced parking supply on both sides of the site, in order to minimize pedestrian crossing of Live Oak Avenue.

Bicycle Parking

No bicycle parking is shown on the site plan. Although no formal bicycle parking requirement exists, it is recommended that bicycle parking be provided throughout the site to accommodate both employees and customers who would bicycle to the site and encourage alternative transportation modes.

Accessible Parking

The Americans with Disabilities Act (ADA) requires that two percent of parking spaces for the first 1,000 parking spaces be handicapped accessible, and one out of every 100 spaces after the first 1,000 parking spaces be handicap accessible. Based on ADA requirements, the project should provide a minimum of 48 handicap accessible parking spaces, based on maximum buildout of a 3,800 parking space lot. In addition, ADA requires that one in eight handicap accessible spaces be van accessible. The handicap accessible parking spaces should be distributed throughout the site and located near the entrances of retailer pads.

CONSISTENCY WITH ADOPTED ALTERNATIVE TRANSPORTATION POLICIES, PLANS, OR PROGRAMS

The City of Oakley General Plan provides several goals and policies that relate to alternative transportation policies, plans, and programs. These goals and policies include:

Goal 3.2 Promote and encourage walking and bicycling

Policy 3.2.1	Promote maximum opportunities for bicycle and pedestrian circulation on existing and new roadway facilities.
Policy 3.2.2	Enhance opportunities for bicycle and pedestrian activity in new public and private development projects.
Policy 3.2.4	Design new roadway facilities to accommodate bicycle and pedestrian traffic. Include Class I, II, or III bicycle facilities as appropriate. Provide sidewalks on all roads, except in cases where very low pedestrian volumes and/or safety concerns preclude sidewalks.
Goal 3.3	Provide adequate, convenient, and affordable public transportation.
Policy 3.3.1	Design new roadways and facilities to accommodate public transit.
Policy 3.3.2	Ensure that new public and private development supports public transit.

Considering the recommendations in the previous sections, the project would not conflict with the City's adopted alternative transportation policies and plans.

FINAL SITE PLAN DESIGN CONSIDERATIONS

The CEQA analysis determines whether the design of the project creates significant impacts requiring mitigation. Based on CEQA criteria, a significant impact would occur if:

- The project substantially increases hazards or congestion due to a design feature (e.g., sharp curves) or incompatible uses (e.g., farm equipment).
- The project results in inadequate emergency access.
- The project conflicts with adopted alternative transportation policies, plans, or programs.

As discussed previously, the proposed project is still in the preliminary design phase and the site plan presented on Figure 2 has not been finalized.

IMPACT 12: The final project site plan for may result in increased hazards due to a design feature, inadequate emergency access, or conflicts with adopted alternative transportation policies, plans, or programs.

MITIGATION MEASURE 12: Mitigation of the potential impact shall be achieved through a review of the final site plan by the City Engineer to ensure the adequacy of the site plan. The following items shall be reviewed and incorporated as project requirements, as necessary:

- The final project site plan shall be verified to determine the adequacy of the project access points to accommodate the forecasted vehicle demand. Access points shall provide adequate number of lanes, and vehicle storage area.
- Pedestrian and bicycle connections shall be provided between the adjacent roadways and the major retailers of the project.

- Traffic calming features, such as speed humps or pavement treatments, and pedestrian enhancements, such as sidewalk curb extensions and pedestrian-scale lighting shall be incorporated in the design of the project roadway between the major retailers and the parking areas to lower vehicle speeds.

- Design of the final site plan shall be coordinated with Tri-Delta Transit to provide bus pullouts and bus shelters on Main Street adjacent to the project site and to provide pedestrian access between the bus stops and the major retailers of the project.

- Truck routes shall be identified through the site and internal intersections and drive aisles should be designed to accommodate the turning radii of large delivery vehicles.

- The proposed project shall provide a minimum of 4.5 parking spaces per thousand square feet of commercial space. To minimize excessive vehicle circulation, the proposed project shall provide a minimum supply of 4.74 parking spaces per thousand square feet of commercial space. The spaces shall be conveniently located throughout the site near all project components. Specifically, parking supply shall be distributed throughout the site to provide adequate supply for project components located east and west of Live Oak Avenue.

- The proposed project shall provide a minimum supply of 1.39 parking spaces per room for the hotel component of the site.

- Bicycle parking shall be provided throughout the site.

- Two percent of the first 1,000 parking spaces, plus one out of each additional 100 spaces in the parking lot shall be handicap accessible. In addition, one out of eight handicap accessible parking spaces shall be van accessible.

The impact would be reduced to ***less-than-significant*** with the implementation of this mitigation measure.

APPENDIX A:
TRAFFIC COUNTS

CITY OF ANTIOCH

All Traffic Data

(916) 771-8700
Fax 786-2879

Site Code : 000000
Start Date: 07/21/
File I.D. : ANT1
Page : 1

Start	MINAKER AVE. Southbound				WILBUR AVE. Westbound				Northbound				Eastbound				
Time	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Total
7:00am	4	1	8	13	2	127	3	132	24	1	3	28	4	28	5	37	210
7:15	2	1	5	8	2	122	1	125	23	1	3	27	3	25	8	36	196
7:30	2	0	2	4	3	130	2	135	20	0	5	25	4	24	12	40	204
7:45	1	0	3	4	1	125	4	130	23	1	2	26	3	25	9	37	197
Hour Total	9	2	18	29	8	504	10	522	90	3	13	106	14	102	34	150	807
8:00am	2	0	4	6	3	84	4	91	17	0	7	24	9	30	8	47	168
8:15	1	0	2	3	2	83	4	89	18	0	4	22	5	23	11	39	153
8:30	0	0	3	3	2	65	2	69	15	0	2	17	2	19	7	28	117
8:45	0	2	2	4	2	61	1	64	14	0	2	16	3	20	8	31	115
Hour Total	3	2	11	16	9	293	11	313	64	0	15	79	19	92	34	145	553
Grand	12	4	29	45	17	797	21	835	154	3	28	185	33	194	68	295	1360
% of Total	.9%	.3%	2.1%		1.2%	58.6%	1.5%		11.3%	.2%	2.1%		2.4%	14.3%	5.0%		
Apprch %				3.3%				61.4%				13.6%				21.7%	
% of Apprch	26.7%	8.9%	64.4%		2.0%	95.4%	2.5%		83.2%	1.6%	15.1%		11.2%	65.8%	23.1%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 07/21/04

		Start	Peak Hr	.... Volumes	....				.... Percentages	....		
Direction	Street Name	Peak Hour	Factor	Left	Thru	Rght	Peds	Total	Left	Thru	Rght	Peds
Southbound	MINAKER AVE.	07:00am	.558	9	2	18	0	29	31.0	6.8	62.0	.0
Westbound	WILBUR AVE.		.967	8	504	10	0	522	1.5	96.5	1.9	.0
Northbound			.946	90	3	13	0	106	84.9	2.8	12.2	.0
Eastbound			.938	14	102	34	0	150	9.3	68.0	22.6	.0

PHF = .87

CITY OF ANTIOCH

All Traffic Data

(916) 771-8700
Fax 786-2879

Site Code : 0000000
Start Date: 07/21/0
File I.D. : ANT1
Page : 1

Start	MINAKER AVE. Southbound				WILBUR AVE. Westbound				Northbound				Eastbound				
Time	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Total
4:00pm	4	1	4	9	6	49	1	56	19	0	3	22	2	94	34	130	217
4:15	2	0	7	9	3	45	1	49	18	0	8	26	5	97	29	131	215
4:30	3	0	4	7	9	47	1	57	22	0	6	28	2	107	27	136	228
4:45	4	2	3	9	5	45	2	52	17	0	10	27	5	97	42	144	232
Hour Total	13	3	18	34	23	186	5	214	76	0	27	103	14	395	132	541	892
5:00pm	4	0	3	7	8	47	1	56	14	0	8	22	3	92	39	134	219
5:15	2	1	5	8	6	40	2	48	13	0	5	18	2	87	37	126	200
5:30	3	0	4	7	5	30	1	36	11	0	7	18	4	88	33	125	186
5:45	2	0	2	4	4	33	0	37	12	0	4	16	2	89	22	113	170
Hour Total	11	1	14	26	23	150	4	177	50	0	24	74	11	356	131	498	775
Grand	24	4	32	60	46	336	9	391	126	0	51	177	25	751	263	1039	1667
% of Total	1.4%	.2%	1.9%		2.8%	20.2%	.5%		7.6%	0.0%	3.1%		1.5%	45.1%	15.8%		
Apprch %				3.6%				23.5%				10.6%				62.3%	
% of Apprch	40.0%	6.7%	53.3%		11.8%	85.9%	2.3%		71.2%	0.0%	28.8%		2.4%	72.3%	25.3%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 07/21/04

		Start	Peak Hr	.... Volumes	....				.... Percentages	....		
Direction	Street Name	Peak Hour	Factor	Left	Thru	Rght	Peds	Total	Left	Thru	Rght	Peds
Southbound	MINAKER AVE.	04:15pm	.889	13	2	17	0	32	40.6	6.2	53.1	.0
Westbound	WILBUR AVE.		.939	25	184	5	0	214	11.6	85.9	2.3	.0
Northbound			.920	71	0	32	0	103	68.9	.0	31.0	.0
Eastbound			.946	15	393	137	0	545	2.7	72.1	25.1	.0

PHF = .90

2

All Traffic Data

CITY OF ANTIOCH

(916) 771-8700
Fax 786-2879

Site Code : 000000C
Start Date: 07/21/C
File I.D. : ANT2
Page : 1

Start					WILBUR AVE.				VIERA AVE.								
	Southbound				Westbound				Northbound				Eastbound				
Time	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Total
7:00am	0	0	0	0	1	117	0	118	8	0	3	11	0	30	2	32	161
7:15	0	0	0	0	1	124	0	125	9	0	2	11	0	32	1	33	169
7:30	0	0	0	0	0	132	0	132	15	0	2	17	0	26	1	27	176
7:45	0	0	0	0	2	131	0	133	14	0	1	15	0	35	5	40	188
Hour Total	0	0	0	0	4	504	0	508	46	0	8	54	0	123	9	132	694
8:00am	0	0	0	0	1	99	0	100	10	0	1	11	0	22	9	31	142
8:15	0	0	0	0	4	94	0	98	7	0	3	10	0	25	4	29	137
8:30	0	0	0	0	3	60	0	63	8	0	1	9	0	20	5	25	97
8:45	0	0	0	0	3	66	0	69	3	0	4	7	0	18	2	20	96
Hour Total	0	0	0	0	11	319	0	330	28	0	9	37	0	85	20	105	472
Grand	0	0	0	0	15	823	0	838	74	0	17	91	0	208	29	237	1166
% of Total	0.0%	0.0%	0.0%		1.3%	70.6%	0.0%		6.3%	0.0%	1.5%		0.0%	17.8%	2.5%		
Apprch %								71.9%				7.8%				20.3%	
% of Apprch	0.0%	0.0%	0.0%		1.8%	98.2%	0.0%		81.3%	0.0%	18.7%		0.0%	87.8%	12.2%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 07/21/04

		Start	Peak Hr	.... Volumes	....				.... Percentages	....		
Direction	Street Name	Peak Hour	Factor	Left	Thru	Rght	Peds	Total	Left	Thru	Rght	Peds
Southbound		07:00am	.0	0	0	0	0	0	0.0	0.0	0.0	0.0
Westbound	WILBUR AVE.		.955	4	504	0	0	508	.7	99.2	.0	.0
Northbound	VIERA AVE.		.794	46	0	8	0	54	85.1	.0	14.8	.0
Eastbound			.825	0	123	9	0	132	.0	93.1	6.8	.0

PHF, 86

2

All Traffic Data

CITY OF ANTIOCH

(916) 771-8700
Fax 786-2879

Site Code : 000000C
Start Date: 07/21/C
File I.D. : ANT2
Page : 1

Start					WILBUR AVE.				VIERA AVE.								
	Southbound				Westbound				Northbound				Eastbound				
Time	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Total
4:00pm	0	0	0	0	2	52	0	54	4	0	2	6	0	83	19	102	162
4:15	0	0	0	0	2	48	0	50	3	0	3	6	0	85	22	107	163
4:30	0	0	0	0	3	46	0	49	5	0	4	9	0	97	20	117	175
4:45	0	0	0	0	2	41	0	43	4	0	2	6	0	95	24	119	168
Hour Total	0	0	0	0	9	187	0	196	16	0	11	27	0	360	85	445	668
5:00pm	0	0	0	0	2	37	0	39	6	0	3	9	0	92	27	119	167
5:15	0	0	0	0	2	34	0	36	6	0	2	8	0	86	21	107	151
5:30	0	0	0	0	2	30	0	32	8	0	4	12	0	94	18	112	156
5:45	0	0	0	0	5	33	0	38	12	0	5	17	0	86	17	103	158
Hour Total	0	0	0	0	11	134	0	145	32	0	14	46	0	358	83	441	632
Grand	0	0	0	0	20	321	0	341	48	0	25	73	0	718	168	886	1300
% of Total	0.0%	0.0%	0.0%		1.5%	24.7%	0.0%		3.7%	0.0%	1.9%		0.0%	55.2%	12.9%		
Apprch %								26.2%				5.6%				68.2%	
% of Apprch	0.0%	0.0%	0.0%		5.9%	94.1%	0.0%		65.8%	0.0%	34.2%		0.0%	81.0%	19.0%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 07/21/04

		Start	Peak Hr	.... Volumes	....				.... Percentages	....		
Direction	Street Name	Peak Hour	Factor	Left	Thru	Rght	Peds	Total	Left	Thru	Rght	Peds
Southbound		04:15pm	.0	0	0	0	0	0	0.0	0.0	0.0	0.0
Westbound	WILBUR AVE.		.905	9	172	0	0	181	4.9	95.0	.0	.0
Northbound	VIERA AVE.		.833	18	0	12	0	30	60.0	.0	40.0	.0
Eastbound			.971	0	369	93	0	462	.0	79.8	20.1	.0

PHF .96

3

CITY OF OAKLEY

All Traffic Data
5098 Foothills Blvd. 3-302
Roseville,CA. 95678
(916)771-8700

Site Code : 00000000
Start Date: 10/30/03
File I.D. : OAKL3
Page : 1

Start	SR160 SB OFF RAMP Southbound				WILBUR AVE. Westbound				Northbound				Eastbound				
Time	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Total
7:00am	12	0	37	49	2	115	0	117	0	0	0	0	0	27	7	34	200
7:15	10	0	33	43	1	109	0	110	0	0	0	0	0	28	5	33	186
7:30	12	0	34	46	3	112	0	115	0	0	0	0	0	32	7	39	200
7:45	10	0	31	41	3	117	0	120	0	0	0	0	0	34	8	42	203
Hour Total	44	0	135	179	9	453	0	462	0	0	0	0	0	121	27	148	789
8:00am	8	0	19	27	2	103	0	105	0	0	0	0	0	25	9	34	166
8:15	7	0	14	21	3	85	0	88	0	0	0	0	0	26	12	38	147
8:30	9	0	15	24	6	72	0	78	0	0	0	0	0	25	10	35	137
8:45	4	0	10	14	6	44	0	50	0	0	0	0	0	23	13	36	100
Hour Total	28	0	58	86	17	304	0	321	0	0	0	0	0	99	44	143	550
Grand	72	0	193	265	26	757	0	783	0	0	0	0	0	220	71	291	1339
% of Total	5.4%	0.0%	14.4%		1.9%	56.5%	0.0%		0.0%	0.0%	0.0%		0.0%	16.4%	5.3%		
Apprch %				19.8%				58.5%								21.7%	
% of Apprch	27.2%	0.0%	72.8%		3.3%	96.7%	0.0%		0.0%	0.0%	0.0%		0.0%	75.5%	24.4%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 10/30/03

Direction	Street Name	Start Peak Hour	Peak Hr Factor	Volumes Left	Thru	Rght		Total	Percentages Left	Thru	Rght	
Southbound	SR160 SB OFF RAMP	07:00am	.913	44	0	135	0	179	24.5	.0	75.4	.0
Westbound	WILSUR AVE.		.962	9	453	0	0	462	1.9	98.0	0	.0
Northbound			.0	0	0	0	0	0	0.0	0.0	0.0	0.0
Eastbound			.881	0	121	27	0	148	.0	81.7	18.2	.0

PHF= .88

3

CITY OF OAKLEY

All Traffic Data
5098 Foothills Blvd. 3-302
Roseville,CA. 95678
(916)771-8700

Site Code : 00000000
Start Date: 10/30/03
File I.D. : OAKL3
Page : 1

Start	SR160 SB OFF RAMP Southbound				WILBUR AVE. Westbound				Northbound				Eastbound				
Time	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Total
4:00pm	18	0	11	29	8	36	0	44	0	0	0	0	0	70	11	81	154
4:15	29	0	12	41	5	32	0	37	0	0	0	0	0	87	13	100	178
4:30	24	0	14	38	8	35	0	43	0	0	0	0	0	85	14	99	180
4:45	31	0	13	44	10	34	0	44	0	0	0	0	0	102	20	122	210
Hour Total	102	0	50	152	31	137	0	168	0	0	0	0	0	344	58	402	722
5:00pm	39	0	19	58	7	41	0	48	0	0	0	0	0	126	21	147	253
5:15	27	0	17	44	8	40	0	48	0	0	0	0	0	135	25	160	252
5:30	21	0	9	30	7	31	0	38	0	0	0	0	0	93	19	112	180
5:45	19	0	7	26	4	22	0	26	0	0	0	0	0	97	14	111	163
Hour Total	106	0	52	158	26	134	0	160	0	0	0	0	0	451	79	530	848
Grand	208	0	102	310	57	271	0	328	0	0	0	0	0	795	137	932	1570
% of Total	13.2%	0.0%	6.5%		3.6%	17.3%	0.0%		0.0%	0.0%	0.0%		0.0%	50.6%	8.7%		
Apprch %				19.7%				20.9%								59.4%	
% of Apprch	67.1%	0.0%	32.9%		17.4%	82.6%	0.0%		0.0%	0.0%	0.0%		0.0%	85.3%	14.7%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 10/30/03

Direction	Street Name	Start Peak Hour	Peak Hr Factor	Volumes Left	Thru	Rght		Total	Percentages Left	Thru	Rght	
Southbound	SR160 SB OFF RAMP	04:45pm	.759	118	0	58	0	176	67.0	.0	32.9	.0
Westbound	WILBUR AVE		.927	32	146	0	0	178	17.9	82.0	.0	.0
Northbound			.0	0	0	0	0	0	0.0	0.0	0.0	0.0
Eastbound			.845	0	456	85	0	541	.0	84.2	15.7	.0

PHF [illegible]

4

All Traffic Data
5098 Foothills Blvd. 3-302
Roseville,CA. 95678
(916)771-8700

CITY OF OAKLEY

Site Code : 00000003
Start Date: 10/30/03
File I.D : OAKL2
Page : 1

	Southbound				WILBUR AVE. Westbound				SR160 NB OFF RAMP Northbound				Eastbound				
Start Time	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Total
7:00am	0	0	0	0	0	108	15	123	9	0	7	16	4	35	0	39	178
7:15	0	0	0	0	0	102	19	121	6	0	4	12	6	32	0	38	171
7:30	0	0	0	0	0	104	25	129	11	0	8	19	8	36	0	44	192
7:45	0	0	0	0	0	111	17	128	9	0	5	14	8	36	0	44	186
Hour Total	0	0	0	0	0	425	76	501	37	0	24	61	26	139	0	165	727
8:00am	0	0	0	0	0	92	19	111	13	0	5	18	5	28	0	33	162
8:15	0	0	0	0	0	77	18	95	11	0	7	18	9	24	0	33	146
8:30	0	0	0	0	0	70	24	94	8	0	3	11	5	29	0	34	139
8:45	0	0	0	0	0	43	13	56	7	0	3	10	2	25	0	27	93
Hour Total	0	0	0	0	0	282	74	356	39	0	19	57	21	106	0	127	540
Grand	0	0	0	0	0	707	150	857	76	0	42	118	47	245	0	292	1267
% of Total	0.0%	0.0%	0.0%		0.0%	55.8%	11.8%		6.0%	0.0%	3.3%		3.7%	19.3%	0.0%		
Apprch %								67.6%				9.3%				23.0%	
% of Apprch	0.0%	0.0%	0.0%		0.0%	82.5%	17.5%		64.4%	0.0%	35.6%		16.1%	83.9%	0.0%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 10/30/03

		Start	Peak Hr	.... Volumes						.. Percentages ...		
Direction	Street Name	Peak Hour	Factor	Left	Thru	Rght		Total	Left	Thru	Rght	
Southbound		07:00am	.0	0	0	0	0	0	0.0	0.0	0.0	0.0
Westbound	WILBUR AVE.		.971	0	425	76	0	501	.0	84.8	15.1	.0
Northbound	SR160 NB OFF RAMP		.803	37	0	24	0	61	60.6	.0	39.3	.0
Eastbound			.938	26	139	0	0	165	15.7	84.2	.0	.0

PHF - .89

4

All Traffic Data
5098 Foothills Blvd. 3-302
Roseville,CA. 95678
(916)771-8700

CITY OF OAKLEY

Site Code : 00000003
Start Date: 10/30/03
File I.D. : OAKL2
Page : 1

	Southbound				WILBUR AVE. Westbound				SR160 NB OFF RAMP Northbound				Eastbound				
Start Time	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Total
4:00pm	0	0	0	0	0	35	37	72	9	0	5	14	23	65	0	88	174
4:15	0	0	0	0	0	32	47	79	5	0	3	8	26	90	0	116	203
4:30	0	0	0	0	0	36	37	73	7	0	4	11	22	87	0	109	193
4:45	0	0	0	0	0	39	38	77	5	0	6	11	25	108	0	133	221
Hour Total	0	0	0	0	0	142	159	301	26	0	18	44	96	350	0	446	791
5:00pm	0	0	0	0	0	44	30	74	4	0	5	9	26	139	0	165	248
5:15	0	0	0	0	0	42	24	66	6	0	5	11	32	130	0	162	239
5:30	0	0	0	0	0	35	21	56	3	0	4	7	24	90	0	114	177
5:45	0	0	0	0	0	24	19	43	2	0	2	4	22	94	0	116	163
Hour Total	0	0	0	0	0	145	94	239	15	0	16	31	104	453	0	557	827
Grand	0	0	0	0	0	287	253	540	41	0	34	75	200	803	0	1003	1618
% of Total	0.0%	0.0%	0.0%		0.0%	17.7%	15.6%		2.5%	0.0%	2.1%		12.4%	49.6%	0.0%		
Apprch %								33.4%				4.6%				62.0%	
% of Apprch	0.0%	0.0%	0.0%		0.0%	53.1%	46.9%		54.7%	0.0%	45.3%		19.9%	80.1%	0.0%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 10/30/03

		Start	Peak Hr	.... Volumes ..						... Percentages		
Direction	Street Name	Peak Hour	Factor	Left	Thru	Rght		Total	Left	Thru	Rght	
Southbound		04:30pm	.0	0	0	0	0	0	0.0	0.0	0.0	0.0
Westbound	WILBUR AVE.		.942	0	161	129	0	290	.0	55.5	44.4	.0
Northbound	SR160 NB OFF RAMP		.955	22	0	20	0	42	52.3	.0	47.6	.0
Eastbound			.862	105	464	0	0	569	18.4	81.5	.0	.0

[illegible]

5

All Traffic Data

CITY OF ANTIOCH

(916) 771-8700
Fax 786-2879

Site Code : 000000
Start Date: 07/21/
File I.D. : ANT3
Page : 1

Start	BRIDGEHEAD RD. Southbound				BUSINESS ENTRANCE Westbound				Northbound				WILBUR AVE. Eastbound				
Time	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Total
7:00am	0	6	4	10	0	0	0	0	112	6	3	121	4	0	28	32	163
7:15	0	5	2	7	0	0	0	0	123	5	0	128	6	0	26	32	167
7:30	0	2	4	6	0	0	0	0	132	8	0	140	4	0	36	40	186
7:45	0	3	3	6	0	0	0	0	108	12	0	120	7	0	33	40	166
Hour Total	0	16	13	29	0	0	0	0	475	31	3	509	21	0	123	144	682
8:00am	0	3	5	8	0	0	0	0	101	11	0	112	6	0	28	34	154
8:15	0	2	4	6	0	1	0	1	85	9	0	94	3	0	32	35	136
8:30	0	5	5	10	0	0	0	0	68	7	0	75	2	0	30	32	117
8:45	0	3	5	8	0	0	0	0	71	9	0	80	2	0	20	22	110
Hour Total	0	13	19	32	0	1	0	1	325	36	0	361	13	0	110	123	517
Grand	0	29	32	61	0	1	0	1	800	67	3	870	34	0	233	267	1199
% of Total	0.0%	2.4%	2.7%		0.0%	.1%	0.0%		66.7%	5.6%	.3%		2.8%	0.0%	19.4%		
Apprch %				5.1%				.1%				72.6%				22.3%	
% of Apprch	0.0%	47.5%	52.5%		0.0%	100.0%	0.0%		92.0%	7.7%	.3%		12.7%	0.0%	87.3%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 07/21/04

Direction	Street Name	Start Peak Hour	Peak Hr Factor	Volumes Left	Thru	Rght	Peds	Total	Percentages Left	Thru	Rght	Peds
Southbound	BRIDGEHEAD RD.	07:00am	.725	0	16	13	0	29	.0	55.1	44.8	.0
Westbound	BUSINESS ENTRANCE		.0	0	0	0	0	0	0.0	0.0	0.0	0.0
Northbound			.909	475	31	3	0	509	93.3	6.0	.5	.0
Eastbound	WILBUR AVE.		.900	21	0	123	0	144	14.5	.0	85.4	.0

PHF= .86

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All Traffic Data

CITY OF ANTIOCH

(916) 771-8700
Fax 786-2879

Site Code : 000000
Start Date: 07/21/
File I.D. : ANT3
Page : 1

Start	BRIDGEHEAD RD. Southbound				BUSINESS ENTRANCE Westbound				Northbound				WILBUR AVE. Eastbound				
Time	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Total
4:00pm	0	13	10	23	0	0	0	0	70	13	0	83	6	0	98	104	210
4:15	0	10	8	18	0	0	0	0	65	11	0	76	7	0	101	108	202
4:30	0	12	10	22	0	0	0	0	70	9	0	79	6	0	105	111	212
4:45	0	8	11	19	0	0	0	0	57	8	0	65	6	0	112	118	202
Hour Total	0	43	39	82	0	0	0	0	262	41	0	303	25	0	416	441	826
5:00pm	0	8	15	23	3	2	0	5	53	10	0	63	8	1	103	112	203
5:15	0	8	8	16	0	0	0	0	49	11	0	60	10	0	98	108	184
5:30	0	7	7	14	0	0	0	0	51	7	0	58	7	0	102	109	181
5:45	0	3	4	7	0	1	0	1	50	5	0	55	5	0	86	91	154
Hour Total	0	26	34	60	3	3	0	6	203	33	0	236	30	1	389	420	722
Grand	0	69	73	142	3	3	0	6	465	74	0	539	55	1	805	861	1548
% of Total	0.0%	4.5%	4.7%		.2%	.2%	0.0%		30.0%	4.8%	0.0%		3.6%	.1%	52.0%		
Apprch %				9.2%				.4%				34.8%				55.6%	
% of Apprch	0.0%	48.6%	51.4%		50.0%	50.0%	0.0%		86.3%	13.7%	0.0%		6.4%	.1%	93.5%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 07/21/04

Direction	Street Name	Start Peak Hour	Peak Hr Factor	Volumes Left	Thru	Rght	Peds	Total	Percentages Left	Thru	Rght	Peds
Southbound	BRIDGEHEAD RD.	04:00pm	.891	0	43	39	0	82	.0	52.4	47.5	.0
Westbound	BUSINESS ENTRANCE		.0	0	0	0	0	0	0.0	0.0	0.0	0.0
Northbound			.913	262	41	0	0	303	86.4	13.5	.0	.0
Eastbound	WILBUR AVE.		.934	25	0	416	0	441	5.6	.0	94.3	.0

[illegible]

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All Traffic Data

CITY OF ANTIOCH

(916) 771-8700
Fax 786-2879

Site Code : 000000
Start Date: 07/21/
File I.D. : ANT4
Page : 1

	HILLCREST AVE. Southbound				E. 18TH ST. Westbound				Northbound				Eastbound				
Start Time	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Total
7:00am	6	11	13	30	22	97	3	122	40	13	26	79	4	24	6	34	265
7:15	4	15	9	28	32	93	9	134	48	24	23	95	2	29	12	43	300
7:30	8	23	11	42	29	106	9	144	51	21	29	101	4	34	16	54	341
7:45	8	19	13	40	41	115	7	163	42	26	33	101	3	31	21	55	359
Hour Total	26	68	46	140	124	411	28	563	181	84	111	376	13	118	55	186	1265
8:00am	5	15	10	30	41	79	6	126	41	23	32	96	4	28	22	54	306
8:15	9	18	5	32	42	76	5	123	40	24	37	101	7	30	17	54	310
8:30	6	21	7	34	38	76	3	117	46	12	38	96	4	34	18	56	303
8:45	6	31	4	41	42	67	6	115	38	12	37	87	2	35	16	53	296
Hour Total	26	85	26	137	163	298	20	481	165	71	144	380	17	127	73	217	1215
Grand	52	153	72	277	287	709	48	1044	346	155	255	756	30	245	128	403	2480
% of Total	2.1%	6.2%	2.9%		11.6%	28.6%	1.9%		14.0%	6.2%	10.3%		1.2%	9.9%	5.2%		
Apprch %				11.2%				42.1%				30.5%				16.2%	
% of Apprch	18.8%	55.2%	26.0%		27.5%	67.9%	4.6%		45.8%	20.5%	33.7%		7.4%	60.8%	31.8%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 07/21/04

Direction	Street Name	Start Peak Hour	Peak Hr Factor	Volumes Left	Volumes Thru	Volumes Rght	Volumes Peds	Volumes Total	Percentages Left	Percentages Thru	Percentages Rght	Percentages Peds
Southbound	HILLCREST AVE.	07:30am	.857	30	75	39	0	144	20.8	52.0	27.0	.0
Westbound	E. 18TH ST.		.853	153	376	27	0	556	27.5	67.6	4.8	.0
Northbound			.988	174	94	131	0	399	43.6	23.5	32.8	.0
Eastbound			.986	18	123	76	0	217	8.2	56.6	35.0	.0

PHF =.92

6

All Traffic Data

CITY OF ANTIOCH

(916) 771-8700
Fax 786-2879

Site Code : 000000
Start Date: 07/21/
File I.D. : ANT4
Page : 1

	HILLCREST AVE. Southbound				E. 18TH ST. Westbound				Northbound				Eastbound				
Start Time	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Total
4:00pm	15	33	9	57	53	79	6	138	43	36	56	135	10	105	45	160	490
4:15	13	27	8	48	57	72	7	136	38	29	58	125	16	109	54	179	488
4:30	12	31	9	52	66	79	4	149	44	33	59	136	13	119	59	191	528
4:45	14	39	6	59	56	73	7	136	43	35	61	139	11	99	61	171	505
Hour Total	54	130	32	216	232	303	24	559	168	133	234	535	50	432	219	701	2011
5:00pm	17	30	5	52	61	80	6	147	35	38	64	137	9	96	56	161	497
5:15	11	25	10	46	45	72	5	122	37	37	65	139	10	101	62	173	480
5:30	8	23	6	37	50	67	4	121	43	41	47	131	9	98	54	161	450
5:45	9	27	6	42	43	58	5	106	39	32	50	121	13	104	57	174	443
Hour Total	45	105	27	177	199	277	20	496	154	148	226	528	41	399	229	669	1870
Grand	99	235	59	393	431	580	44	1055	322	281	460	1063	91	831	448	1370	3881
% of Total	2.6%	6.1%	1.5%		11.1%	14.9%	1.1%		8.3%	7.2%	11.9%		2.3%	21.4%	11.5%		
Apprch %				10.1%				27.2%				27.4%				35.3%	
% of Apprch	25.2%	59.8%	15.0%		40.9%	55.0%	4.2%		30.3%	26.4%	43.3%		6.6%	60.7%	32.7%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 07/21/04

Direction	Street Name	Start Peak Hour	Peak Hr Factor	Volumes Left	Volumes Thru	Volumes Rght	Volumes Peds	Volumes Total	Percentages Left	Percentages Thru	Percentages Rght	Percentages Peds
Southbound	HILLCREST AVE.	04:15pm	.894	56	127	28	0	211	26.5	60.1	13.2	.0
Westbound	E. 18TH ST.		.953	240	304	24	0	568	42.2	53.5	4.2	.0
Northbound			.966	160	135	242	0	537	29.7	25.1	45.0	.0
Eastbound			.919	49	423	230	0	702	6.9	60.2	32.7	.0

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All Traffic Data

CITY OF ANTIOCH

(916) 771-8700
Fax 786-2879

Site Code : 000000
Start Date: 07/20/
File I.D. : ANT5
Page : 1

	VIERA AVE. Southbound				E. 18TH ST. Westbound				Northbound				Eastbound				
Start Time	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Total
7:00am	1	1	9	11	0	96	10	106	24	6	0	30	2	31	6	39	186
7:15	1	3	10	14	0	93	12	105	23	5	1	29	4	36	8	48	196
7:30	2	5	11	18	0	92	9	101	29	4	0	33	8	40	9	57	209
7:45	4	7	13	24	0	96	7	103	39	6	1	46	6	56	8	70	243
Hour Total	8	16	43	67	0	377	38	415	115	21	2	138	20	163	31	214	834
8:00am	5	4	8	17	0	84	5	89	16	6	0	22	4	48	11	63	191
8:15	7	3	6	16	0	69	7	76	17	9	0	26	2	48	7	57	175
8:30	2	2	8	12	0	82	4	86	18	4	0	22	4	46	9	59	179
8:45	3	2	9	14	1	89	3	93	18	6	2	26	3	61	13	77	210
Hour Total	17	11	31	59	1	324	19	344	69	25	2	96	13	203	40	256	755
Grand	25	27	74	126	1	701	57	759	184	46	4	234	33	366	71	470	1589
% of Total	1.6%	1.7%	4.7%		.1%	44.1%	3.6%		11.6%	2.9%	.3%		2.1%	23.0%	4.5%		
Apprch %				7.9%				47.8%				14.7%				29.6%	
% of Apprch	19.8%	21.4%	58.7%		.1%	92.4%	7.5%		78.6%	19.7%	1.7%		7.0%	77.9%	15.1%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 07/20/04

				.... Volumes	....				.... Percentages	....		
Direction	Street Name	Start Peak Hour	Peak Hr Factor	Left	Thru	Rght	Peds	Total	Left	Thru	Rght	Peds
Southbound	VIERA AVE.	07:15am	.760	12	19	42	0	73	16.4	26.0	57.5	.0
Westbound	E. 18TH ST.		.948	0	365	33	0	398	.0	91.7	8.2	.0
Northbound			.707	107	21	2	0	130	82.3	16.1	1.5	.0
Eastbound			.850	22	180	36	0	238	9.2	75.6	15.1	.0

PHF = .8[illegible]

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All Traffic Data

CITY OF ANTIOCH

(916) 771-8700
Fax 786-2879

Site Code : 000000
Start Date: 07/20/
File I.D. : ANT5
Page : 1

	VIERA AVE. Southbound				E. 18TH ST. Westbound				Northbound				Eastbound				
Start Time	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Total
4:00pm	9	8	12	29	0	85	10	95	16	4	1	21	8	95	17	120	265
4:15	8	10	8	26	3	82	8	93	16	2	1	19	6	96	35	137	275
4:30	10	8	10	28	0	80	6	86	15	2	1	18	9	116	29	154	286
4:45	5	12	6	23	2	75	5	82	23	2	1	26	11	109	27	147	278
Hour Total	32	38	36	106	5	322	29	356	70	10	4	84	34	416	108	558	1104
5:00pm	6	9	7	22	0	94	9	103	19	4	1	24	7	117	32	156	305
5:15	11	10	8	29	0	71	6	77	22	5	0	27	8	126	25	159	292
5:30	8	11	9	28	1	82	3	86	18	3	2	23	6	111	24	141	278
5:45	5	15	7	27	0	71	8	79	22	4	2	28	5	102	18	125	259
Hour Total	30	45	31	106	1	318	26	345	81	16	5	102	26	456	99	581	1134
Grand	62	83	67	212	6	640	55	701	151	26	9	186	60	872	207	1139	2238
% of Total	2.8%	3.7%	3.0%		.3%	28.6%	2.5%		6.7%	1.2%	.4%		2.7%	39.0%	9.2%		
Apprch %				9.5%				31.3%				8.3%				50.9%	
% of Apprch	29.2%	39.2%	31.6%		.9%	91.3%	7.8%		81.2%	14.0%	4.8%		5.3%	76.6%	18.2%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 07/20/04

				.... Volumes	....				.... Percentages	....		
Direction	Street Name	Start Peak Hour	Peak Hr Factor	Left	Thru	Rght	Peds	Total	Left	Thru	Rght	Peds
Southbound	VIERA AVE.	04:30pm	.879	32	39	31	0	102	31.3	38.2	30.3	.0
Westbound	E. 18TH ST.		.845	2	320	26	0	348	.5	91.9	7.4	.0
Northbound			.880	79	13	3	0	95	83.1	13.6	3.1	.0
Eastbound			.969	35	468	113	0	616	5.6	75.9	18.3	.0

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All Traffic Data

CITY OF ANTIOCH

(916) 771-8700
Fax 786-2879

Site Code : 000000
Start Date: 07/20/
File I.D. : ANT8
Page : 1

Start	CONSTRUCTION DW Southbound				E. 18TH ST. Westbound				PHILLIPS LN. Northbound				Eastbound				
Time	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Total
7:00am	0	0	0	0	2	74	0	76	1	0	1	2	0	25	0	25	103
7:15	0	0	0	0	2	84	0	86	2	0	3	5	0	25	1	26	117
7:30	0	0	0	0	2	90	1	93	2	0	4	6	0	36	0	36	135
7:45	0	0	0	0	3	94	0	97	0	0	2	2	0	37	1	38	137
Hour Total	0	0	0	0	9	342	1	352	5	0	10	15	0	123	2	125	492
8:00am	0	0	0	0	0	72	0	72	2	0	2	4	0	54	0	54	130
8:15	0	0	0	0	2	70	0	72	0	0	1	1	0	52	1	53	126
8:30	0	0	0	0	0	69	0	69	1	0	2	3	0	42	0	42	114
8:45	0	0	0	0	0	81	0	81	0	0	1	1	0	54	1	55	137
Hour Total	0	0	0	0	2	292	0	294	3	0	6	9	0	202	2	204	507
Grand	0	0	0	0	11	634	1	646	8	0	16	24	0	325	4	329	999
% of Total	0.0%	0.0%	0.0%		1.1%	63.5%	.1%		.8%	0.0%	1.6%		0.0%	32.5%	.4%		
Apprch %								64.7%				2.4%				32.9%	
% of Apprch	0.0%	0.0%	0.0%		1.7%	98.1%	.2%		33.3%	0.0%	66.7%		0.0%	98.8%	1.2%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 07/20/04

Direction	Street Name	Start Peak Hour	Peak Hr Factor	Volumes Left	Thru	Rght	Peds	Total	Percentages Left	Thru	Rght	Peds
Southbound	CONSTRUCTION DW	07:30am	.0	0	0	0	0	0	0.0	0.0	0.0	0.0
Westbound	E. 18TH ST.		.861	7	326	1	0	334	2.0	97.6	.2	.0
Northbound	PHILLIPS LN.		.542	4	0	9	0	13	30.7	.0	69.2	.0
Eastbound			.838	0	179	2	0	181	.0	98.8	1.1	.0

PHF = .76

8

All Traffic Data

CITY OF ANTIOCH

(916) 771-8700
Fax 786-2879

Site Code : 000000
Start Date: 07/20/
File I.D. : ANT8
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Start	CONSTRUCTION DW Southbound				E. 18TH ST. Westbound				PHILLIPS LN. Northbound				Eastbound				
Time	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Total
4:00pm	0	0	1	1	1	61	0	62	1	0	5	6	0	82	0	82	151
4:15	0	0	0	0	2	69	0	71	0	0	4	4	0	93	3	96	171
4:30	0	0	0	0	1	74	1	76	0	0	4	4	1	93	2	96	176
4:45	0	0	0	0	0	83	0	83	0	0	4	4	1	86	1	88	175
Hour Total	0	0	1	1	4	287	1	292	1	0	17	18	2	354	6	362	673
5:00pm	0	0	0	0	1	84	0	85	0	0	4	4	0	92	2	94	183
5:15	0	0	0	0	1	78	0	79	0	0	6	6	0	97	1	98	183
5:30	0	0	0	0	3	74	1	78	0	0	3	3	0	91	2	93	174
5:45	0	0	0	0	1	67	0	68	3	0	2	5	0	86	0	86	159
Hour Total	0	0	0	0	6	303	1	310	3	0	15	18	0	366	5	371	699
Grand	0	0	1	1	10	590	2	602	4	0	32	36	2	720	11	733	1372
% of Total	0.0%	0.0%	.1%		.7%	43.0%	.1%		.3%	0.0%	2.3%		.1%	52.5%	.8%		
Apprch %				.1%				43.9%				2.6%				53.4%	
% of Apprch	0.0%	0.0%	100.0%		1.7%	98.0%	.3%		11.1%	0.0%	88.9%		.3%	98.2%	1.5%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 07/20/04

Direction	Street Name	Start Peak Hour	Peak Hr Factor	Volumes Left	Thru	Rght	Peds	Total	Percentages Left	Thru	Rght	Peds
Southbound	CONSTRUCTION DW	04:30pm	.0	0	0	0	0	0	0.0	0.0	0.0	0.0
Westbound	E. 18TH ST.		.950	3	319	1	0	323	.9	98.7	.3	.0
Northbound	PHILLIPS LN.		.750	0	0	18	0	18	.0	.0	100.0	.0
Eastbound			.959	2	368	6	0	376	.5	97.8	1.5	.0

[illegible]

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CITY OF OAKLEY

All Traffic Data
(916) 771-8700
Fax 786-2879

Site Code : 00000000
Start Date: 05/12/04
File I.D. : MAINSBRF
Page : 1

	COMMERCIAL BUSINESS Southbound				MAIN STREET Westbound				SR 160 S/B OFF-RAMP Northbound				Eastbound				
Start Time	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Total
7:00am	3	5	6	14	222	70	12	304	3	1	21	25	1	33	1	35	378
7:15	3	5	3	11	218	84	7	309	2	0	28	30	1	42	6	49	399
7:30	5	3	4	12	240	96	7	343	2	2	27	31	2	28	4	34	420
7:45	3	4	4	11	258	88	13	359	3	2	7	12	0	47	5	52	434
Hour Total	14	17	17	48	935	338	39	1315	10	5	83	98	4	150	16	170	1631
8:00am	9	3	4	16	233	68	16	317	3	1	16	20	3	40	3	45	399
8:15	8	1	4	13	281	85	21	387	1	1	9	11	5	54	5	64	475
8:30	9	5	4	18	237	69	15	321	3	4	17	24	4	42	1	47	410
9:45	8	12	7	27	229	66	19	314	3	2	16	21	1	33	5	39	401
Hour Total	34	21	19	74	980	288	71	1339	10	8	58	76	13	169	14	196	1685
Grand	48	38	36	122	1918	626	110	2654	20	13	141	174	17	319	30	366	3316
% of Total	1.4%	1.1%	1.1%		57.8%	18.9%	3.3%		.6%	.4%	4.3%		.5%	9.6%	.9%		
Apprch %				3.7%				80.0%				5.2%				11.0%	
% of Apprch	39.3%	31.1%	29.5%		72.3%	23.6%	4.1%		11.5%	7.6%	81.0%		4.5%	87.2%	8.2%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 05/12/04

Direction	Street Name	Start Peak Hour	Peak Hr Factor	.... Volumes .... Left	Thru	Rght	Total	.... Percentages .... Left	Thru	Rght
Southbound	COMMERCIAL BUSINESS	07:30am	.812	25	11	16	52	48.0	21.1	30.7
Westbound	MAIN STREET		.908	1012	337	57	1406	71.9	23.9	4.0
Northbound	SR 160 S/B OFF-RAMP		.597	9	6	59	74	12.1	8.1	79.7
Eastbound			.766	10	169	17	196	5.1	86.2	8.6

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CITY OF OAKLEY

All Traffic Data
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Site Code : 00000000
Start Date: 05/12/04
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Page : 1

	COMMERCIAL BUSINESS Southbound				MAIN STREET Westbound				SR 160 S/B OFF-RAMP Northbound				Eastbound				
Start Time	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Total
4:00pm	23	10	4	37	213	66	24	303	5	7	19	31	5	64	11	80	451
4:15	22	12	2	36	212	74	21	307	3	1	23	27	3	86	10	99	469
4:30	26	11	4	41	193	57	26	276	2	3	29	34	6	97	6	109	460
4:45	17	5	4	26	207	68	27	302	1	4	28	33	3	88	18	109	470
Hour Total	88	38	14	140	825	265	98	1188	11	15	99	125	17	335	45	397	1850
5:00pm	19	11	6	36	205	66	23	294	4	2	21	27	3	76	13	92	449
5:15	16	7	2	25	209	84	20	313	1	4	24	29	2	90	10	102	469
5:30	22	7	2	31	222	62	26	310	4	6	41	51	5	80	13	98	490
5:45	21	11	5	37	194	57	14	265	3	4	11	18	4	69	15	88	408
Hour Total	78	36	15	129	830	269	83	1182	12	16	97	125	14	315	51	380	1816
Grand	166	74	29	269	1655	534	181	2370	23	31	196	250	31	650	96	777	3666
% of Total	4.5%	2.0%	.8%		45.1%	14.6%	4.9%		.6%	.8%	5.3%		.8%	17.7%	2.6%		
Apprch %				7.3%				64.6%				6.8%				21.2%	
% of Apprch	61.7%	27.5%	10.8%		69.8%	22.5%	7.6%		9.2%	12.4%	78.4%		4.0%	83.7%	12.4%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 05/12/04

Direction	Street Name	Start Peak Hour	Peak Hr Factor	.... Volumes .... Left	Thru	Rght	Total	.... Percentages .... Left	Thru	Rght
Southbound	COMMERCIAL BUSINESS	04:45pm	.819	74	30	14	118	62.7	25.4	11.8
Westbound	MAIN STREET		.974	843	280	96	1219	69.1	22.9	7.8
Northbound	SR 160 S/B OFF-RAMP		.686	10	16	114	140	7.1	11.4	81.4
Eastbound			.920	13	334	54	401	3.2	83.2	13.4

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Site Code : 00000000
Start Date: 05/12/04
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					MAIN ST.				SR 160 OFF-RAMP								
	Southbound				Westbound				Northbound				Eastbound				
Start Time	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Total
7:00am	0	0	0	0	15	298	0	313	6	0	136	142	0	52	5	57	512
7:15	0	0	0	0	11	300	0	311	7	0	161	168	0	68	2	70	549
7:30	0	0	0	0	11	329	0	340	16	0	185	201	0	57	6	63	604
7:45	0	0	0	0	9	344	0	353	17	0	200	217	0	50	6	56	626
Hour Total	0	0	0	0	46	1271	0	1317	46	0	682	728	0	227	19	246	2291
8:00am	0	C	0	0	9	307	0	316	6	0	175	181	0	62	4	66	563
8:15	0	0	0	0	19	362	0	381	19	0	183	202	0	60	9	69	652
8:30	0	0	0	0	18	312	0	330	10	0	179	189	0	65	5	70	589
8:45	0	0	0	0	8	298	0	306	15	0	188	203	0	48	9	57	566
Hour Total	0	0	0	0	54	1279	0	1333	50	0	725	775	0	235	27	262	2370
Grand	0	0	0	0	100	2550	0	2650	56	0	1407	1503	0	462	46	508	4661
% of Total	0.0%	0.0%	0.0%		2.1%	54.7%	0.0%		2.1%	0.0%	30.2%		0.0%	9.9%	1.0%		
Apprch %								56.9%				32.2%				10.9%	
% of Apprch	0.0%	0.0%	0.0%		3.8%	96.2%	0.0%		6.4%	0.0%	93.6%		0.0%	90.9%	9.1%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 05/12/04

		Start	Peak Hr	.... Volumes				.... Percentages		
Direction	Street Name	Peak Hour	Factor	Left	Thru	Rght	Total	Left	Thru	Rght
Southbound		07:30am	.0	0	0	0	0	0.0	0.0	0.0
Westbound	MAIN ST.		.912	48	1342	0	1390	3.4	96.5	.0
Northbound	SR 160 OFF-RAMP		.923	58	0	743	801	7.2	.0	92.7
Eastbound			.920	0	229	25	254	.0	90.1	9.8

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CITY OF OAKLEY

All Traffic Data
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Site Code : 00000000
Start Date: 05/12/04
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					MAIN ST.				SR 160 OFF-RAMP								
	Southbound				Westbound				Northbound				Eastbound				
Start Time	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Total
4:00pm	0	0	0	0	16	290	0	306	16	0	393	409	0	97	7	104	819
4:15	0	0	0	0	29	292	0	321	19	0	411	430	0	122	11	133	884
4:30	0	0	0	0	10	260	0	270	19	0	345	364	0	136	13	149	783
4:45	0	0	0	0	24	290	0	314	15	0	362	377	0	126	5	131	822
Hour Total	0	0	0	0	79	1132	0	1211	69	0	1511	1580	0	481	36	517	3308
5:00pm	0	0	0	0	7	271	0	278	18	0	420	438	0	112	9	121	837
5:15	0	0	0	0	9	296	0	305	20	0	383	403	0	125	4	129	837
5:30	0	0	0	0	8	307	0	315	10	0	420	430	0	126	13	139	884
5:45	0	0	0	0	19	246	0	265	16	0	412	428	0	93	6	99	792
Hour Total	0	0	0	0	43	1120	0	1163	64	0	1635	1699	0	456	32	488	3350
Grand	0	0	0	0	122	2252	0	2374	133	0	3146	3279	0	937	68	1005	6658
% of Total	0.0%	0.0%	0.0%		1.8%	33.8%	0.0%		2.0%	0.0%	47.3%		0.0%	14.1%	1.0%		
Apprch %								35.7%				49.2%				15.1%	
% of Apprch	0.0%	0.0%	0.0%		5.1%	94.9%	0.0%		4.1%	0.0%	95.9%		0.0%	93.2%	6.8%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 05/12/04

		Start	Peak Hr	.... Volumes				.... Percentages		
Direction	Street Name	Peak Hour	Factor	Left	Thru	Rght	Total	Left	Thru	Rght
Southbound		04:45pm	.0	0	0	0	0	0.0	0.0	0.0
Westbound	MAIN ST.		.962	48	1164	0	1212	3.9	96.0	.0
Northbound	SR 160 OFF-RAMP		.941	63	0	1585	1648	3.8	.0	96.1
Eastbound			.935	0	489	31	620	.0	94.0	5.9

CITY OF OAKLEY

All Traffic Data
(916) 771-8700
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Site Code : 00000000
Start Date: 05/12/04
File I.D. : MAINBRGF
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Start	BRIDGEHEAD RD.				MAIN ST. (SR 4)				NEROLY RD.								
	Southbound				Westbound				Northbound				Eastbound				
Time	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Total
7:00am	29	9	14	52	3	221	85	309	81	33	9	123	9	124	50	183	667
7:15	26	10	18	54	4	229	98	331	77	46	5	128	12	155	50	217	730
7:30	47	15	12	74	4	236	77	317	91	50	9	150	13	172	52	237	778
7:45	36	16	19	71	3	269	88	360	86	40	9	135	12	166	66	243	809
Hour Total	138	50	63	251	14	955	348	1317	335	169	32	536	46	616	218	880	2984
8:00am	42	9	12	63	6	244	93	343	82	26	8	116	12	161	45	218	740
8:15	35	20	21	76	4	252	90	346	88	30	7	125	20	168	38	226	773
8:30	27	11	21	59	13	225	63	301	77	26	7	110	19	177	31	227	697
8:45	26	12	16	54	7	222	46	275	66	22	8	96	18	163	37	218	643
Hour Total	130	52	70	252	30	943	292	1265	313	104	30	447	69	669	151	889	2853
Grand	268	102	133	503	44	1898	640	2582	648	273	62	983	115	1285	369	1769	5837
% of Total	4.6%	1.7%	2.3%		.8%	32.5%	11.0%		11.1%	4.7%	1.1%		2.0%	22.0%	6.3%		
Apprch %				8.6%				44.2%				16.8%				30.3%	
% of Apprch	53.3%	20.3%	26.4%		1.7%	73.5%	24.8%		65.9%	27.8%	6.3%		6.5%	72.6%	20.9%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 05/12/04

		Start	Peak Hr	.... Volumes				.... Percentages		
Direction	Street Name	Peak Hour	Factor	Left	Thru	Rght	Total	Left	Thru	Rght
Southbound	BRIDGEHEAD RD.	07:30am	.934	160	60	64	284	56.3	21.1	22.5
Westbound	MAIN ST. (SR 4)		.949	17	1001	348	1366	1.2	73.2	25.4
Northbound	NEROLY RD.		.877	347	146	33	526	65.9	27.7	6.2
Eastbound			.951	57	666	201	924	6.1	72.0	21.7

CITY OF OAKLEY

All Traffic Data
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Site Code : 00000000
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Start	BRIDGEHEAD RD.				MAIN ST. (SR 4)				NEROLY RD.								
	Southbound				Westbound				Northbound				Eastbound				
Time	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Total
4:00pm	80	34	14	128	12	227	43	282	54	29	9	92	13	350	103	466	968
4:15	78	31	14	123	9	242	40	291	59	26	6	91	13	335	97	445	950
4:30	84	34	21	139	4	194	38	236	65	26	6	97	25	329	108	462	934
4:45	83	32	12	127	4	233	49	286	71	22	7	100	10	345	89	444	957
Hour Total	325	131	61	517	29	896	170	1095	249	103	28	380	61	1359	397	1817	3809
5:00pm	93	35	11	139	5	219	43	267	65	29	9	103	13	364	114	491	1000
5:15	83	32	24	139	5	231	44	280	64	18	10	92	10	320	126	456	967
5:30	80	28	10	118	4	221	25	250	79	15	12	106	21	368	120	509	983
5:45	89	38	13	140	3	197	36	236	60	23	8	91	23	267	101	391	858
Hour Total	345	133	58	536	17	869	148	1033	268	85	39	392	67	1319	461	1847	3808
Grand	670	264	119	1053	46	1764	318	2128	517	188	67	772	128	2678	858	3664	7617
% of Total	8.8%	3.5%	1.6%		.6%	23.2%	4.2%		6.8%	2.5%	.9%		1.7%	35.2%	11.3%		
Apprch %				13.8%				27.9%				10.1%				48.1%	
% of Apprch	63.6%	25.1%	11.3%		2.2%	82.9%	14.9%		67.0%	24.4%	8.7%		3.5%	73.1%	23.4%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 05/12/04

		Start	Peak Hr	.... Volumes				.... Percentages		
Direction	Street Name	Peak Hour	Factor	Left	Thru	Rght	Total	Left	Thru	Rght
Southbound	BRIDGEHEAD RD.	04:45pm	.941	339	127	57	523	64.8	24.2	10.8
Westbound	MAIN ST. (SR 4)		.947	18	904	161	1083	1.6	83.4	14.8
Northbound	NEROLY RD.		.946	279	84	38	401	69.5	20.9	9.4
Eastbound			.933	54	1397	449	1900	2.8	73.5	23.6

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CITY OF OAKLEY

All Traffic Data
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Site Code : 00000000
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	Southbound				MAIN ST. (SR 4) Westbound				SANDY LANE Northbound				Eastbound				
Start Time	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Total
7:00am	0	0	0	0	0	315	0	315	1	0	0	1	0	151	0	151	467
7:15	0	0	0	0	0	343	0	343	0	0	0	0	0	180	0	180	523
7:30	0	0	0	0	2	299	0	301	1	0	0	1	0	218	0	218	520
7:45	0	0	0	0	0	372	0	372	0	0	0	0	0	206	1	207	579
Hour Total	0	0	0	0	2	1329	0	1331	2	0	0	2	0	755	1	756	2089
8:00am	0	0	0	0	2	347	0	349	2	0	1	3	0	210	2	212	564
8:15	0	0	0	0	0	353	0	353	1	0	1	2	0	203	1	204	559
8:30	0	0	0	0	0	313	0	313	0	0	1	1	0	210	2	212	526
8:45	0	0	0	0	1	279	0	280	0	0	1	1	0	200	0	200	481
Hour Total	0	0	0	0	3	1292	0	1295	3	0	4	7	0	823	5	828	2130
Grand	0	0	0	0	5	2621	0	2626	5	0	4	9	0	1578	6	1584	4219
% of Total	0.0%	0.0%	0.0%		.1%	62.1%	0.0%		.1%	0.0%	.1%		0.0%	37.4%	.1%		
Apprch %								62.2%				.2%				37.5%	
% of Apprch	0.0%	0.0%	0.0%		.2%	99.8%	0.0%		55.6%	0.0%	44.4%		0.0%	99.6%	.4%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 05/12/04

		Start	Peak Hr	.... Volumes				.... Percentages		
Direction	Street Name	Peak Hour	Factor	Left	Thru	Rght	Total	Left	Thru	Rght
Southbound		07:45am	.0	0	0	0	0	0.0	0.0	0.0
Westbound	MAIN ST. (SR 4)		.932	2	1385	0	1387	.1	99.8	.0
Northbound	SANDY LANE		.500	3	0	3	6	50.0	.0	50.0
Eastbound			.985	0	829	6	835	.0	99.2	.7

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CITY OF OAKLEY

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Site Code : 00000000
Start Date: 05/12/04
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	Southbound				MAIN ST. (SR 4) Westbound				SANDY LANE Northbound				Eastbound				
Start Time	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Total
4:00pm	0	0	0	0	2	289	0	291	1	0	1	2	0	423	0	423	716
4:15	0	0	0	0	0	299	0	299	1	0	1	2	0	434	1	435	736
4:30	0	0	0	0	0	226	0	226	0	0	1	1	0	426	0	426	653
4:45	0	0	0	0	0	292	0	292	0	0	0	0	0	428	1	429	721
Hour Total	0	0	0	0	2	1106	0	1108	2	0	3	5	0	1711	2	1713	2826
5:00pm	0	0	0	0	0	277	0	277	0	0	0	0	0	458	0	458	735
5:15	0	0	0	0	0	252	0	252	0	0	0	0	0	416	0	416	668
5:30	0	0	0	0	0	258	0	258	0	0	1	1	0	445	0	445	704
5:45	0	0	0	0	0	228	0	228	1	0	0	1	0	372	0	372	601
Hour Total	0	0	0	0	0	1015	0	1015	1	0	1	2	0	1691	0	1691	2708
Grand	0	0	0	0	2	2121	0	2123	3	0	4	7	0	3402	2	3404	5534
% of Total	0.0%	0.0%	0.0%		0.0%	38.3%	0.0%		.1%	0.0%	.1%		0.0%	61.5%	0.0%		
Apprch %								38.4%				.1%				61.5%	
% of Apprch	0.0%	0.0%	0.0%		.1%	99.9%	0.0%		42.9%	0.0%	57.1%		0.0%	99.9%	.1%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 05/12/04

		Start	Peak Hr	.... Volumes				.... Percentages		
Direction	Street Name	Peak Hour	Factor	Left	Thru	Rght	Total	Left	Thru	Rght
Southbound		04:15pm	.0	0	0	0	0	0.0	0.0	0.0
Westbound	MAIN ST. (SR 4)		.915	0	1094	0	1094	.0	100.0	.0
Northbound	SANDY LANE		.376	1	0	2	3	33.3	.0	66.6
Eastbound			.954	0	1746	2	1748	.0	99.8	.1

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CITY OF OAKLEY

All Traffic Data
(916) 771-8700
Fax 786-2879

Site Code : 00000000
Start Date: 05/12/04
File I.D. : MAINLIVF
Page : 1

Start	Southbound				MAIN ST. (SR 4) Westbound				LIVE OAK AVE. Northbound				Eastbound				
Time	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Total
7:00am	0	0	0	0	1	309	0	310	5	0	2	7	0	152	4	156	473
7:15	0	0	0	0	1	325	0	326	9	0	3	12	0	169	8	177	515
7:30	0	0	0	0	5	294	0	299	8	0	5	13	0	208	6	214	526
7:45	0	0	0	0	8	361	0	369	8	0	2	10	0	203	4	207	586
Hour Total	0	0	0	0	15	1289	0	1304	30	0	12	42	0	732	22	754	2100
8:00am	0	0	0	0	3	335	0	338	7	0	3	10	0	204	10	214	562
8:15	0	0	0	0	3	345	0	348	11	0	8	19	0	194	6	200	567
8:30	0	0	0	0	0	316	0	316	2	0	5	7	0	209	6	215	538
8:45	0	0	0	0	2	263	0	265	4	0	4	8	0	186	8	194	467
Hour Total	0	0	0	0	8	1259	0	1267	24	0	20	44	0	793	30	823	2134
Grand	0	0	0	0	23	2548	0	2571	54	0	32	86	0	1525	52	1577	4234
% of Total	0.0%	0.0%	0.0%		.5%	60.2%	0.0%		1.3%	0.0%	.8%		0.0%	36.0%	1.2%		
Apprch %								60.7%				2.0%				37.2%	
% of Apprch	0.0%	0.0%	0.0%		.9%	99.1%	0.0%		62.8%	0.0%	37.2%		0.0%	96.7%	3.3%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 05/12/04

		Start	Peak Hr	.... Volumes				.... Percentages		
Direction	Street Name	Peak Hour	Factor	Left	Thru	Rght	Total	Left	Thru	Rght
Southbound		07:45am	.0	0	0	0	0	0.0	0.0	0.0
Westbound	MAIN ST. (SR 4)		.929	14	1357	0	1371	1.0	98.9	.0
Northbound	LIVE OAK AVE.		.605	28	0	18	46	60.8	.0	39.1
Eastbound			.972	0	810	26	836	.0	96.8	3.1

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CITY OF OAKLEY

All Traffic Data
(916) 771-8700
Fax 786-2879

Site Code : 00000000
Start Date: 05/12/04
File I.D. : MAINLIVF
Page : 1

Start	Southbound				MAIN ST. (SR 4) Westbound				LIVE OAK AVE. Northbound				Eastbound				
Time	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Total
4:00pm	0	0	0	0	1	284	0	285	7	0	11	18	0	398	15	413	716
4:15	0	0	0	0	3	290	0	293	5	0	7	12	0	409	23	432	737
4:30	0	0	0	0	1	216	0	217	10	0	11	21	0	409	14	423	661
4:45	0	0	0	0	5	274	0	279	7	0	5	12	0	419	18	437	728
Hour Total	0	0	0	0	10	1064	0	1074	29	0	34	63	0	1635	70	1705	2842
5:00pm	0	0	0	0	4	272	0	276	2	0	9	11	0	435	16	451	738
5:15	0	0	0	0	2	249	0	251	6	0	9	15	0	401	13	414	680
5:30	0	0	0	0	2	261	0	263	5	0	5	10	0	415	19	434	707
5:45	0	0	0	0	6	233	0	239	1	0	5	6	0	363	15	378	623
Hour Total	0	0	0	0	14	1015	0	1029	14	0	28	42	0	1614	63	1677	2748
Grand	0	0	0	0	24	2079	0	2103	43	0	62	105	0	3249	133	3382	5590
% of Total	0.0%	0.0%	0.0%		.4%	37.2%	0.0%		.8%	0.0%	1.1%		0.0%	58.1%	2.4%		
Apprch %								37.6%				1.9%				60.5%	
% of Apprch	0.0%	0.0%	0.0%		1.1%	98.9%	0.0%		41.0%	0.0%	59.0%		0.0%	96.1%	3.9%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 05/12/04

		Start	Peak Hr	.... Volumes				.... Percentages		
Direction	Street Name	Peak Hour	Factor	Left	Thru	Rght	Total	Left	Thru	Rght
Southbound		04:15pm	.0	0	0	0	0	0.0	0.0	0.0
Westbound	MAIN ST. (SR 4)		.909	13	1052	0	1065	1.2	98.7	.0
Northbound	LIVE OAK AVE.		.667	24	0	32	56	42.8	.0	57.1
Eastbound			.966	0	1672	71	1743	.0	95.9	4.0

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CITY OF OAKLEY

All Traffic Data
(916) 771-8700
Fax 786-2879

Site Code : 00000000
Start Date: 05/12/04
File I.D. : MAINBIGF
Page : 1

Start	BIG BREAK RD. Southbound				MAIN ST. Westbound				Northbound				Eastbound				
Time	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Total
7:00am	5	4	34	43	7	271	8	286	10	1	2	13	6	140	9	155	497
7:15	8	6	40	54	4	272	1	277	15	1	7	23	11	157	11	179	533
7:30	15	10	35	60	13	264	10	287	16	3	7	26	12	187	9	208	581
7:45	20	9	51	80	10	301	12	323	12	6	5	23	23	174	4	201	627
Hour Total	48	29	160	237	34	1108	31	1173	53	11	21	85	52	658	33	743	2238
8:00am	11	11	45	67	11	293	15	319	15	6	8	29	22	180	8	210	625
8:15	5	6	51	62	14	277	14	305	14	3	6	23	15	194	9	218	608
8:30	7	8	39	54	12	263	11	286	12	5	5	22	18	177	12	207	569
8:45	4	5	24	33	9	222	8	239	15	3	2	20	12	161	16	189	481
Hour Total	27	30	159	216	46	1055	48	1149	56	17	21	94	67	712	45	824	2283
Grand	75	59	319	453	80	2163	79	2322	109	28	42	179	119	1370	78	1567	4521
% of Total	1.7%	1.3%	7.1%		1.8%	47.8%	1.7%		2.4%	.6%	.9%		2.6%	30.3%	1.7%		
Apprch %				10.0%				51.4%				4.0%				34.7%	
% of Apprch	16.5%	13.0%	70.4%		3.4%	93.2%	3.4%		60.9%	15.6%	23.5%		7.6%	87.4%	5.0%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 05/12/04

Direction	Street Name	Start Peak Hour	Peak Hr Factor	.... Volumes				.... Percentages		
				Left	Thru	Rght	Total	Left	Thru	Rght
Southbound	BIG BREAK RD.	07:30am	.841	51	36	182	269	18.9	13.3	67.6
Westbound	MAIN ST.		.955	48	1135	51	1234	3.8	91.9	4.1
Northbound			.871	57	18	26	101	56.4	17.8	25.7
Eastbound			.960	72	735	30	837	8.6	87.8	3.5

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CITY OF OAKLEY

All Traffic Data
(916) 771-8700
Fax 786-2879

Site Code : 00000000
Start Date: 05/12/04
File I.D. : MAINBIGF
Page : 1

Start	BIG BREAK RD. Southbound				MAIN ST. Westbound				Northbound				Eastbound				
Time	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Total
4:00pm	13	14	30	57	25	227	26	278	23	11	17	51	40	321	33	394	780
4:15	7	4	22	33	16	249	14	279	20	9	10	39	38	335	48	421	772
4:30	13	8	27	48	20	200	11	231	17	12	21	50	50	328	40	418	747
4:45	9	9	15	33	23	241	22	286	22	17	26	65	56	326	35	417	801
Hour Total	42	35	94	171	84	917	73	1074	82	49	74	205	184	1310	156	1650	3100
5:00pm	7	9	27	43	12	198	15	225	21	13	24	58	62	323	43	428	754
5:15	12	6	30	48	12	213	9	234	9	10	21	40	59	325	41	425	747
5:30	6	13	29	48	17	211	12	240	16	12	17	45	58	283	35	376	709
5:45	12	8	23	43	25	177	7	209	22	11	23	56	38	284	38	360	668
Hour Total	37	36	109	182	66	799	43	908	68	46	85	199	217	1215	157	1589	2878
Grand	79	71	203	353	150	1716	116	1982	150	95	159	404	401	2525	313	3239	5978
% of Total	1.3%	1.2%	3.4%		2.5%	28.7%	1.9%		2.5%	1.6%	2.7%		6.7%	42.2%	5.2%		
Apprch %				5.9%				33.2%				6.8%				54.2%	
% of Apprch	22.4%	20.1%	57.5%		7.6%	86.6%	5.9%		37.1%	23.5%	39.4%		12.4%	78.0%	9.7%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 05/12/04

Direction	Street Name	Start Peak Hour	Peak Hr Factor	.... Volumes				.... Percentages		
				Left	Thru	Rght	Total	Left	Thru	Rght
Southbound	BIG BREAK RD.	04:00pm	.750.	42	35	94	171	24.5	20.4	54.9
Westbound	MAIN ST.		.939	84	917	73	1074	7.8	85.3	6.7
Northbound			.788	82	49	74	205	40.0	23.9	36.0
Eastbound			.980	184	1310	156	1650	11.1	79.3	9.4

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All Traffic Data

CITY OF ANTIOCH

(916) 771-8700
Fax 786-2879

Site Code : 00000000
Start Date: 07/21/04
File I.D. : ANT9
Page : 1

	NEROLY RD.				OAKLEY RD.												
	Southbound				Westbound				Northbound				Eastbound				
Start Time	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Total
7:00am	11	38	1	50	1	12	33	46	12	70	0	82	2	4	3	9	187
7:15	14	53	2	69	2	19	44	65	14	68	0	82	3	8	7	18	234
7:30	10	44	2	56	0	21	34	55	19	81	2	102	2	5	5	12	225
7:45	9	39	1	49	0	16	34	50	15	78	2	95	2	4	8	14	208
Hour Total	44	174	6	224	3	68	145	216	60	297	4	361	9	21	23	53	854
8:00am	11	43	0	54	1	13	29	43	14	88	0	102	2	7	7	16	215
8:15	8	45	1	54	0	14	27	41	15	73	0	88	2	5	5	12	195
8:30	10	34	2	46	1	12	29	42	15	64	1	80	2	5	7	14	182
8:45	12	37	4	53	0	10	25	35	11	64	0	75	1	3	2	6	169
Hour Total	41	159	7	207	2	49	110	161	55	289	1	345	7	20	21	48	761
Grand	85	333	13	431	5	117	255	377	115	586	5	706	16	41	44	101	1615
% of Total	5.3%	20.6%	.8%		.3%	7.2%	15.8%		7.1%	36.3%	.3%		1.0%	2.5%	2.7%		
Apprch %				26.7%				23.3%				43.7%				6.3%	
% of Apprch	19.7%	77.3%	3.0%		1.3%	31.0%	67.6%		16.3%	83.0%	.7%		15.8%	40.6%	43.6%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 07/21/04

		Start	Peak Hr	.... Volumes	....				.... Percentages	....		
Direction	Street Name	Peak Hour	Factor	Left	Thru	Rght	Peds	Total	Left	Thru	Rght	Peds
Southbound	NEROLY RD.	07:15am	.826	44	179	5	0	228	19.2	78.5	2.1	.0
Westbound	OAKLEY RD.		.819	3	69	141	0	213	1.4	32.3	66.1	.0
Northbound			.934	62	315	4	0	381	16.2	82.6	1.0	.0
Eastbound			.833	9	24	27	0	60	15.0	40.0	45.0	.0

PHF = .94

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All Traffic Data

CITY OF ANTIOCH

(916) 771-8700
Fax 786-2879

Site Code : 00000000
Start Date: 07/21/04
File I.D. : ANT9
Page : 1

	NEROLY RD.				OAKLEY RD.												
	Southbound				Westbound				Northbound				Eastbound				
Start Time	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Total
4:00pm	40	103	3	146	1	10	29	40	12	70	0	82	3	22	23	48	316
4:15	42	111	4	157	0	8	28	36	14	75	4	93	2	19	21	42	328
4:30	49	109	2	160	0	11	24	35	16	66	6	88	2	20	26	48	331
4:45	46	107	3	156	3	9	25	37	11	61	2	74	1	21	18	40	307
Hour Total	177	430	12	619	4	38	106	148	53	272	12	337	8	82	88	178	1282
5:00pm	41	111	3	155	2	10	29	41	10	58	3	71	1	24	22	47	314
5:15	43	108	2	153	2	12	23	37	15	64	1	80	2	19	19	40	310
5:30	37	111	2	150	0	13	19	32	16	57	2	75	2	15	24	41	298
5:45	40	114	3	157	0	8	24	32	14	50	2	66	0	18	24	42	297
Hour Total	161	444	10	615	4	43	95	142	55	229	8	292	5	76	89	170	1219
Grand	338	874	22	1234	8	81	201	290	108	501	20	629	13	158	177	348	2501
% of Total	13.5%	34.9%	.9%		.3%	3.2%	8.0%		4.3%	20.0%	.8%		.5%	6.3%	7.1%		
Apprch %				49.3%				11.6%				25.1%				13.9%	
% of Apprch	27.4%	70.8%	1.8%		2.8%	27.9%	69.3%		17.2%	79.7%	3.2%		3.7%	45.4%	50.9%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 07/21/04

		Start	Peak Hr	.... Volumes	....				.... Percentages	....		
Direction	Street Name	Peak Hour	Factor	Left	Thru	Rght	Peds	Total	Left	Thru	Rght	Peds
Southbound	NEROLY RD.	04:00pm	.967	177	430	12	0	619	28.5	69.4	1.9	.0
Westbound	OAKLEY RD.		.925	4	38	106	0	148	2.7	25.6	71.6	.0
Northbound			.906	53	272	12	0	337	15.7	80.7	3.5	.0
Eastbound			.927	8	82	88	0	178	4.4	46.0	49.4	.0

PHF = .97

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CITY OF OAKLEY

All Traffic Data, Inc.
(916) 771-8700
F (916) 786-2879

File Name : LIVEOA~1
Site Code : 00000000
Start Date : 8/10/06
Page No : 1

Groups Printed- 1 - Unshifted

	LIVE OAK AVENUE Southbound				OAKLEY ROAD Westbound				Northbound				Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
07:00 AM	1	5	2	8	1	37	1	39	17	12	0	29	0	8	0	8	84
07:15 AM	1	6	0	7	2	31	2	35	10	7	2	19	0	10	2	12	73
07:30 AM	3	6	0	9	9	50	4	63	14	10	6	30	0	22	5	27	129
07:45 AM	1	6	0	7	7	29	2	38	15	6	0	21	1	21	4	26	92
Total	6	23	2	31	19	147	9	175	56	35	8	99	1	61	11	73	378
08:00 AM	0	5	0	5	3	39	1	43	10	9	2	21	3	19	1	23	92
08:15 AM	1	7	1	9	2	40	3	45	15	7	4	26	2	21	2	25	105
08:30 AM	2	9	1	12	0	29	1	30	6	7	1	14	4	16	1	21	77
08:45 AM	0	4	2	6	1	37	1	39	6	8	1	15	0	14	4	18	78
Total	3	25	4	32	6	145	6	157	37	31	8	76	9	70	8	87	352
04:00 PM	17	22	1	40	2	25	4	31	5	4	6	15	3	41	7	51	137
04:15 PM	20	35	3	58	2	37	0	39	10	5	3	18	4	47	5	56	171
04:30 PM	18	35	1	54	4	30	3	37	4	6	1	11	2	46	10	58	160
04:45 PM	16	27	0	43	3	27	1	31	14	8	8	30	5	39	11	55	159
Total	71	119	5	195	11	119	8	138	33	23	18	74	14	173	33	220	627
05:00 PM	28	27	3	58	9	28	5	42	8	11	3	22	2	45	7	54	176
05:15 PM	17	21	0	38	12	31	4	47	5	6	9	20	1	45	12	58	163
05:30 PM	15	16	2	33	6	26	2	34	10	7	4	21	0	33	4	37	125
05:45 PM	14	21	2	37	4	27	2	33	7	2	8	17	3	34	5	42	129
Total	74	85	7	166	31	112	13	156	30	26	24	80	6	157	28	191	593
Grand Total	154	252	18	424	67	523	36	626	156	115	58	329	30	461	80	571	1950
Apprch %	36.3	59.4	4.2		10.7	83.5	5.8		47.4	35.0	17.6		5.3	80.7	14.0		
Total %	7.9	12.9	0.9	21.7	3.4	26.8	1.8	32.1	8.0	5.9	3.0	16.9	1.5	23.6	4.1	29.3	

	LIVE OAK AVENUE Southbound				OAKLEY ROAD Westbound				Northbound				Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Intersection	07:30 AM																
Volume	5	24	1	30	21	158	10	189	54	32	12	98	6	83	12	101	418
Percent	16.7	80.0	3.3		11.1	83.6	5.3		55.1	32.7	12.2		5.9	82.2	11.9		
07:30 Volume	3	6	0	9	9	50	4	63	14	10	6	30	0	22	5	27	129
Peak Factor																	0.810
High Int.	07:30 AM				07:30 AM				07:30 AM				07:30 AM				
Volume	3	6	0	9	9	50	4	63	14	10	6	30	0	22	5	27	
Peak Factor				0.833				0.750				0.817				0.935	

All Traffic Data
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Fax 786-2879

CITY OF OAKLEY

Site Code : 00000000
Start Date: 04/24/02
File I.D. : 16
Page : 1

Start	EMPIRE AVENUE				SHOPPING CENTER								OAKLEY ROAD				
	Southbound				Westbound				Northbound				Eastbound				
Time	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Total
7:00am	2	30	8	40	0	1	8	9	33	77	0	110	6	0	13	19	178
7:15	8	41	2	51	1	3	7	11	31	92	0	123	10	2	15	27	212
7:30	3	48	7	58	0	2	8	10	38	96	0	134	17	0	19	36	238
7:45	7	56	14	77	1	0	2	3	42	134	0	176	17	3	23	43	299
Hour Total	20	175	31	226	2	6	25	33	144	399	0	543	50	5	70	125	927
8:00am	7	70	9	86	0	2	3	5	42	114	2	158	12	1	23	36	285
8:15	11	66	11	88	6	2	8	16	47	115	1	163	19	3	21	43	310
8:30	16	58	18	92	5	2	6	13	34	104	1	139	9	0	23	32	276
8:45	10	37	5	52	3	4	5	12	26	82	1	109	12	0	11	23	196
Hour Total	44	231	43	318	14	10	22	46	149	415	5	569	52	4	78	134	1067
Grand	64	406	74	544	16	16	47	79	293	814	5	1112	102	9	148	259	1994
% of Total	3.2%	20.4%	3.7%		.8%	.8%	2.4%		14.7%	40.8%	.3%		5.1%	.5%	7.4%		
Apprch %				27.3%				4.0%				55.8%				13.0%	
% of Apprch	11.8%	74.6%	13.6%		20.3%	20.3%	59.5%		26.3%	73.2%	.4%		39.4%	3.5%	57.1%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 04/24/02

		Start	Peak Hr	....	Volumes	....		....	Percentages	....		
Direction	Street Name	Peak Hour	Factor	Left	Thru	Rght		Total	Left	Thru	Rght	
Southbound	EMPIRE AVENUE	07:45am	.932	41	250	52	0	343	11.9	72.8	15.1	.0
Westbound	SHOPPING CENTER		.578	12	6	19	0	37	32.4	16.2	51.3	.0
Northbound			.903	165	467	4	0	636	25.9	73.4	.6	.0
Eastbound	OAKLEY ROAD		.895	57	7	90	0	154	37.0	4.5	58.4	.0

All Traffic Data
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CITY OF OAKLEY

Site Code : 00000000
Start Date: 04/24/02
File I.D. : 16
Page : 1

Start	EMPIRE AVENUE				SHOPPING CENTER								OAKLEY ROAD				
	Southbound				Westbound				Northbound				Eastbound				
Time	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Total
4:00pm	19	87	14	120	13	2	16	31	35	99	2	136	9	5	58	72	359
4:15	26	109	14	149	4	10	18	32	35	96	1	132	14	9	54	77	390
4:30	30	114	18	162	5	9	11	25	37	116	1	154	12	3	48	63	404
4:45	41	153	22	216	15	7	11	33	30	129	1	160	19	10	49	78	487
Hour Total	116	463	68	647	37	28	56	121	137	440	5	582	54	27	209	290	1640
5:00pm	33	126	17	176	12	12	19	43	30	91	3	124	11	7	74	92	435
5:15	30	143	15	188	14	6	14	34	37	94	4	135	13	8	61	82	439
5:30	41	126	18	185	7	8	16	31	37	106	2	145	9	6	71	86	447
5:45	36	124	19	179	13	6	17	36	33	85	1	119	18	10	74	102	436
Hour Total	140	519	69	728	46	32	66	144	137	376	10	523	51	31	280	362	1757
Grand	256	982	137	1375	83	60	122	265	274	816	15	1105	105	58	489	652	3397
% of Total	7.5%	28.9%	4.0%		2.4%	1.8%	3.6%		8.1%	24.0%	.4%		3.1%	1.7%	14.4%		
Apprch %				40.5%				7.8%				32.5%				19.2%	
% of Apprch	18.6%	71.4%	10.0%		31.3%	22.6%	46.0%		24.8%	73.8%	1.4%		16.1%	8.9%	75.0%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 04/24/02

		Start	Peak Hr	....	Volumes	....		....	Percentages	....		
Direction	Street Name	Peak Hour	Factor	Left	Thru	Rght		Total	Left	Thru	Rght	
Southbound	EMPIRE AVENUE	04:45pm	.885	145	548	72	0	765	18.9	71.6	9.4	.0
Westbound	SHOPPING CENTER		.820	48	33	60	0	141	34.0	23.4	42.5	.0
Northbound			.881	134	420	10	0	564	23.7	74.4	1.7	.0
Eastbound	OAKLEY ROAD		.918	52	31	255	0	338	15.3	9.1	75.4	.0

WILTEC

Phone: (925) 706-9911 Fax: (925) 706-9914

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT:		FEHR AND PEERS CONSULTANTS
PROJECT:		OAKLEY TRAFFIC COUNTS
DATE:		WEDNESDAY, OCTOBER 27TH, 2004
PERIODS:		7:00 AM TO 9:00 AM AND 4:00 PM TO 6:00 PM
INTERSECTION:	N/S	MAIN STREET
	E/W	EMPIRE AVENUE

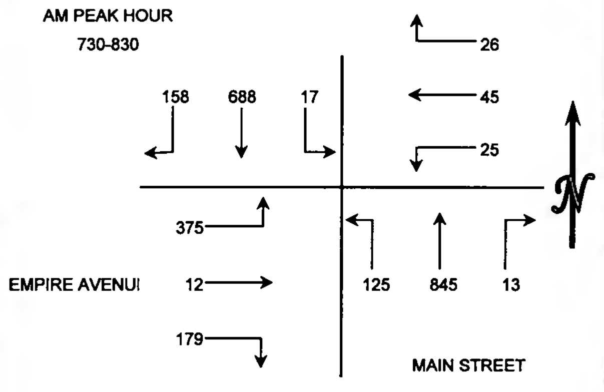
15 MIN COUNTS — 7:00 AM TO 9:00 AM

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-715	27	169	3	8	4	1	0	178	14	12	1	77	494
715-730	29	146	1	9	6	2	1	180	12	17	0	71	474
730-745	27	189	2	6	12	3	1	203	34	33	1	85	596
745-800	46	162	4	7	14	4	1	214	28	40	2	90	612
800-815	47	176	4	6	14	10	3	216	25	62	4	109	676
815-830	38	161	7	7	5	8	8	212	38	44	5	91	624
830-845	36	147	6	6	5	1	4	210	26	28	10	90	569
845-900	34	129	10	7	2	4	1	187	19	24	0	71	488

HOUR TOTALS

TIME	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-800	129	666	10	30	36	10	3	775	88	102	4	323	2176
715-815	149	673	11	28	46	19	6	813	99	152	7	355	2358
730-830	158	688	17	26	45	25	13	845	125	179	12	375	2508
745-845	167	646	21	26	38	23	16	852	117	174	21	380	2481
800-900	155	613	27	26	26	23	16	825	108	158	19	361	2357

AM PEAK HOUR
730-830



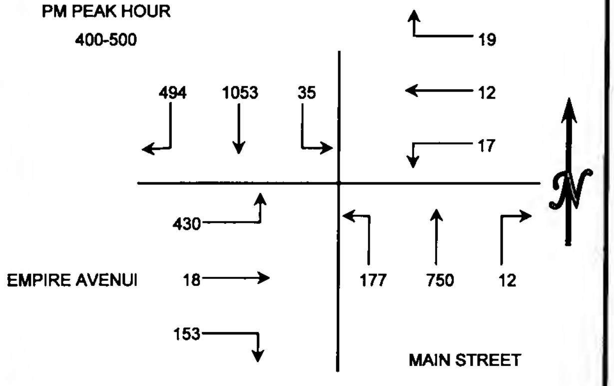
15 MIN COUNTS — 4:00 PM TO 6:00 PM

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-415	117	248	17	5	7	3	3	195	46	37	7	109	794
415-430	108	243	6	6	2	5	3	183	47	38	1	107	749
430-445	130	268	7	4	3	3	5	200	40	37	5	111	813
445-500	139	294	5	4	0	6	1	172	44	41	5	103	814
500-515	147	242	13	4	5	3	5	191	44	22	8	68	752
515-530	109	250	21	3	4	3	3	161	46	42	10	98	750
530-545	116	260	6	1	5	2	0	165	39	43	5	97	739
545-600	116	260	8	2	5	4	2	169	57	44	11	94	772

HOUR TOTALS

TIME	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-500	494	1053	35	19	12	17	12	750	177	153	18	430	3170
415-515	524	1047	31	18	10	17	14	746	175	138	19	389	3128
430-530	525	1054	46	15	12	15	14	724	174	142	28	380	3129
445-545	511	1046	45	12	14	14	9	689	173	148	28	366	3055
500-600	488	1012	48	10	19	12	10	686	186	151	34	357	3013

PM PEAK HOUR
400-500



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CITY OF OAKLEY

All Traffic Data, Inc.
(916) 771-8700
F (916) 786-2879

File Name : mergedvp-main
Site Code : 00000000
Start Date : 8/10/06
Page No : 1

Groups Printed- 1 - Unshifted

	VINTAGE PARKWAY				MAIN STREET												
	Southbound				Westbound				Northbound				Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
07:00 AM	19	0	28	47	0	189	9	198	0	0	0	0	7	194	0	201	446
07:15 AM	50	0	24	74	0	167	17	184	0	0	0	0	15	194	0	209	467
07:30 AM	73	0	36	109	0	169	23	192	0	0	0	0	17	238	0	255	556
07:45 AM	79	0	29	108	0	177	39	216	0	0	0	0	29	213	0	242	566
Total	221	0	117	338	0	702	88	790	0	0	0	0	68	839	0	907	2035
08:00 AM	70	0	46	116	0	162	39	201	0	0	0	0	51	176	0	227	544
08:15 AM	30	0	34	64	0	161	46	207	0	0	0	0	31	160	0	191	462
08:30 AM	27	0	30	57	0	224	31	255	0	0	0	0	17	141	0	158	470
08:45 AM	24	0	26	50	0	223	23	246	0	0	0	0	21	167	0	188	484
Total	151	0	136	287	0	770	139	909	0	0	0	0	120	644	0	764	1960
04:00 PM	27	0	17	44	0	244	31	275	0	0	0	0	28	281	0	309	628
04:15 PM	32	0	23	55	0	241	36	277	0	0	0	0	25	261	0	286	618
04:30 PM	40	0	19	59	0	226	36	262	0	0	0	0	24	244	0	268	589
04:45 PM	42	0	23	65	0	205	39	244	0	0	0	0	43	289	0	332	641
Total	141	0	82	223	0	916	142	1058	0	0	0	0	120	1075	0	1195	2476
05:00 PM	53	0	25	78	0	188	33	221	0	0	0	0	36	270	0	306	605
05:15 PM	43	0	31	74	0	182	43	225	0	0	0	0	37	308	0	345	644
05:30 PM	40	0	29	69	0	212	44	256	0	0	0	0	53	311	0	364	689
05:45 PM	46	0	42	88	0	202	36	238	0	0	0	0	37	256	0	293	619
Total	182	0	127	309	0	784	156	940	0	0	0	0	163	1145	0	1308	2557
Grand Total	695	0	462	1157	0	3172	525	3697	0	0	0	0	471	3703	0	4174	9028
Apprch %	60.1	0.0	39.9		0.0	85.8	14.2		0.0	0.0	0.0		11.3	88.7	0.0		
Total %	7.7	0.0	5.1	12.8	0.0	35.1	5.8	41.0	0.0	0.0	0.0	0.0	5.2	41.0	0.0	46.2	

	VINTAGE PARKWAY				MAIN STREET												
	Southbound				Westbound				Northbound				Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Intersection	07:15 AM																
Volume	272	0	135	407	0	675	118	793	0	0	0	0	112	821	0	933	2133
Percent	66.8	0.0	33.2		0.0	85.1	14.9		0.0	0.0	0.0		12.0	88.0	0.0		
07:45 Volume	79	0	29	108	0	177	39	216	0	0	0	0	29	213	0	242	566
Peak Factor																	0.942
High Int.	08:00 AM				07:45 AM				6:45:00 AM				07:30 AM				
Volume	70	0	46	116	0	177	39	216	0	0	0	0	17	238	0	255	
Peak Factor				0.877				0.918								0.915	

WILTEC

Phone: (925) 706-9911 Fax: (925) 706-9914

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT: FEHR AND PEERS CONSULTANTS
PROJECT: OAKLEY TRAFFIC COUNTS
DATE: WEDNESDAY, OCTOBER 27TH, 2004
PERIODS: 7:00 AM TO 9:00 AM AND 4:00 PM TO 6:00 PM
INTERSECTION: N/S O'HARA AVENUE
E/W STATE ROUTE 4 / MAIN STREET

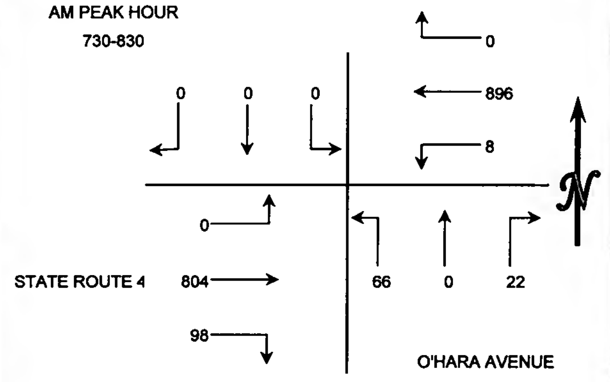
15 MIN COUNTS **7:00 AM TO 9:00 AM**

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-715	0	0	0	0	173	4	0	0	10	3	189	0	379
715-730	0	0	0	0	185	7	8	0	8	8	195	0	411
730-745	0	0	0	0	207	1	8	0	19	18	229	0	482
745-800	0	0	0	0	226	5	4	0	17	12	203	0	467
800-815	0	0	0	0	230	2	5	0	19	37	188	0	481
815-830	0	0	0	0	233	0	5	0	11	31	184	0	464
830-845	0	0	0	0	209	6	8	0	20	15	199	0	457
845-900	0	0	0	0	190	0	9	0	4	8	169	0	380

HOUR TOTALS

TIME	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-800	0	0	0	0	791	17	20	0	54	41	816	0	1739
715-815	0	0	0	0	848	15	25	0	63	75	815	0	1841
730-830	0	0	0	0	896	8	22	0	66	98	804	0	1894
745-845	0	0	0	0	898	13	22	0	67	95	774	0	1869
800-900	0	0	0	0	862	8	27	0	54	91	740	0	1782

AM PEAK HOUR
730-830



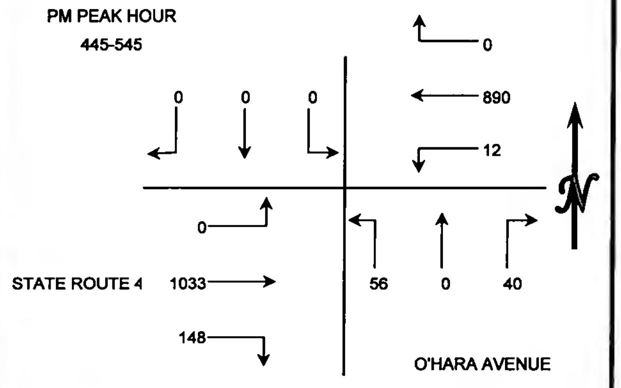
15 MIN COUNTS **4:00 PM TO 6:00 PM**

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-415	0	0	0	0	186	5	9	0	9	31	238	0	478
415-430	0	0	0	0	181	4	6	0	17	33	276	0	517
430-445	0	0	0	0	206	3	8	0	8	27	249	0	501
445-500	0	0	0	0	232	6	9	0	14	36	285	0	582
500-515	0	0	0	0	241	1	7	0	9	32	244	0	534
515-530	0	0	0	0	208	1	12	0	19	34	240	0	514
530-545	0	0	0	0	209	4	12	0	14	46	264	0	549
545-600	0	0	0	0	243	1	2	0	14	34	233	0	527

HOUR TOTALS

TIME	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-500	0	0	0	0	805	18	32	0	48	127	1048	0	2078
415-515	0	0	0	0	860	14	30	0	48	128	1054	0	2134
430-530	0	0	0	0	887	11	36	0	50	129	1018	0	2131
445-545	0	0	0	0	890	12	40	0	56	148	1033	0	2179
500-600	0	0	0	0	901	7	33	0	56	146	981	0	2124

PM PEAK HOUR
445-545



WILTEC

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INTERSECTION TURNING MOVEMENT COUNT SUMMARY

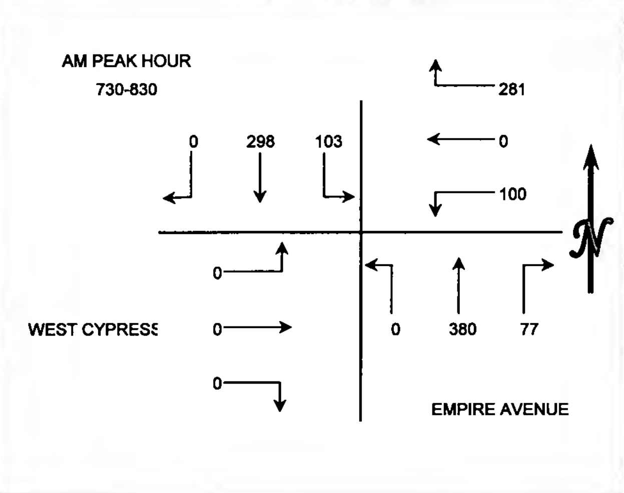
CLIENT: FEHR AND PEERS CONSULTANTS
PROJECT: OAKLEY TRAFFIC COUNTS
DATE: WEDNESDAY, OCTOBER 27TH, 2004
PERIODS: 7:00 AM TO 9:00 AM AND 4:00 PM TO 6:00 PM
INTERSECTION: N/S EMPIRE AVENUE
E/W WEST CYPRESS ROAD

15 MIN COUNTS — 7:00 AM TO 9:00 AM

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-715	0	50	5	40	0	10	5	42	0	0	0	0	152
715-730	0	76	21	48	0	15	6	58	0	0	0	0	224
730-745	0	92	27	65	0	39	15	100	0	0	0	0	338
745-800	0	74	21	64	0	19	23	106	0	0	0	0	307
800-815	0	78	33	75	0	23	21	84	0	0	0	0	314
815-830	0	54	22	77	0	19	18	90	0	0	0	0	280
830-845	0	38	19	53	0	15	12	63	0	0	0	0	200
845-900	0	38	10	41	0	6	8	60	0	0	0	0	163

HOUR TOTALS

TIME	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-800	0	292	74	217	0	83	49	306	0	0	0	0	1021
715-815	0	320	102	252	0	96	65	348	0	0	0	0	1183
730-830	0	298	103	281	0	100	77	380	0	0	0	0	1239
745-845	0	244	95	269	0	76	74	343	0	0	0	0	1101
800-900	0	208	84	246	0	63	59	297	0	0	0	0	957

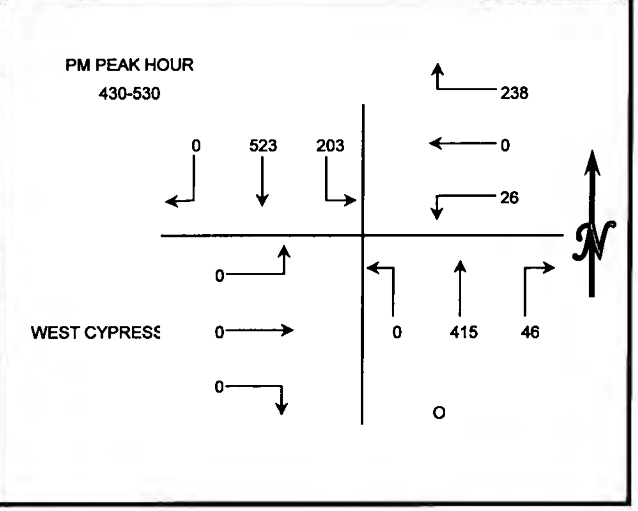


15 MIN COUNTS — 4:00 PM TO 6:00 PM

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-415	0	102	49	69	0	10	7	93	0	0	0	0	330
415-430	0	106	54	75	0	11	7	112	0	0	0	0	365
430-445	0	119	40	69	0	8	12	102	0	0	0	0	350
445-500	0	135	43	57	0	11	10	100	0	0	0	0	356
500-515	0	133	55	58	0	1	11	103	0	0	0	0	361
515-530	0	136	65	54	0	6	13	110	0	0	0	0	384
530-545	0	123	57	50	0	5	13	98	0	0	0	0	346
545-600	0	130	54	53	0	5	17	96	0	0	0	0	355

HOUR TOTALS

TIME	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-500	0	462	186	270	0	40	36	407	0	0	0	0	1401
215-315	0	0	0	0	0	0	0	0	0	0	0	0	0
230-330	0	0	0	0	0	0	0	0	0	0	0	0	0
245-345	0	0	0	0	0	0	0	0	0	0	0	0	0
300-400	0	0	0	0	0	0	0	0	0	0	0	0	0



WILTEC

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INTERSECTION TURNING MOVEMENT COUNT SUMMARY

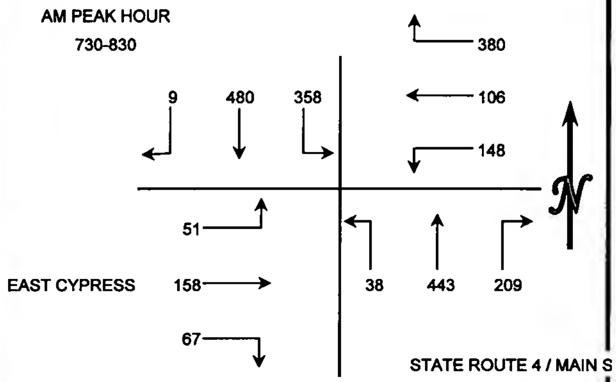
CLIENT:		FEHR AND PEERS CONSULTANTS	
PROJECT:		OAKLEY TRAFFIC COUNTS	
DATE:		TUESDAY, OCTOBER 26TH, 2004	
PERIODS:		7:00 AM TO 9:00 AM AND	4:00 PM TO 6:00 PM
INTERSECTION:	N/S	STATE ROUTE 4 / MAIN STREET	
	E/W	EAST CYPRESS ROAD	

15 MIN COUNTS — **7:00 AM TO 9:00 AM**

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-715	1	123	64	63	6	12	5	94	2	9	13	7	399
715-730	1	118	75	60	11	17	9	92	3	8	19	9	422
730-745	1	133	92	79	20	38	30	108	7	16	25	11	560
745-800	1	114	96	76	22	30	51	107	15	27	35	10	584
800-815	2	114	87	114	32	33	80	120	8	13	63	19	685
815-830	5	119	83	111	32	47	48	108	8	11	35	11	618
830-845	7	116	69	89	30	30	35	111	7	14	24	11	543
845-900	4	104	62	69	21	26	22	104	11	11	17	10	461

HOUR TOTALS

TIME	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-800	4	488	327	278	59	97	95	401	27	60	92	37	1965
715-815	5	479	350	329	85	118	170	427	33	64	142	49	2251
730-830	9	480	358	380	106	148	209	443	38	67	158	51	2447
745-845	15	463	335	390	116	140	214	446	38	65	157	51	2430
800-900	18	453	301	383	115	136	185	443	34	49	139	51	2307

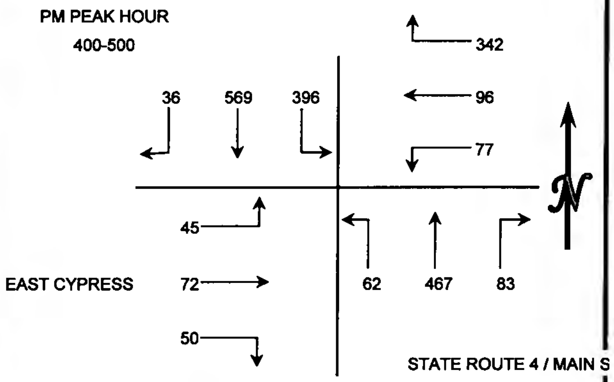


15 MIN COUNTS — **4:00 PM TO 6:00 PM**

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-415	10	131	105	118	30	38	30	132	18	12	16	18	658
415-430	9	146	87	71	26	17	20	115	15	14	15	11	546
430-445	9	140	103	81	20	8	13	111	16	10	16	10	537
445-500	8	152	101	72	20	14	20	109	13	14	25	6	554
500-515	13	152	103	92	26	14	19	133	15	14	20	14	615
515-530	13	143	93	61	33	16	21	108	9	9	18	2	526
530-545	3	150	82	63	35	9	26	88	16	9	17	7	505
545-600	8	148	104	58	22	11	12	123	13	7	14	13	533

HOUR TOTALS

TIME	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-500	36	569	396	342	96	77	83	467	62	50	72	45	2295
415-515	39	590	394	316	92	53	72	468	59	52	76	41	2252
430-530	43	587	400	306	99	52	73	461	53	47	79	32	2232
445-545	37	597	379	288	114	53	86	438	53	46	80	29	2200
500-600	37	593	382	274	116	50	78	452	53	39	69	36	2179



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①

All Traffic Data

CITY OF BRENTWOOD

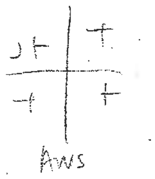
(916) 771-8700
Fax 786-2879

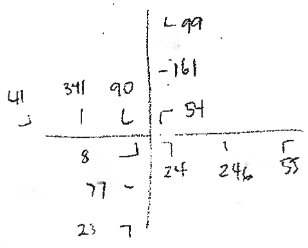
Site Code : 00000000
Start Date: 03/02/04
File I.D. : BRENT1
Page : 1

	EMPIRE AVE.				LAUREL RD.												
	Southbound				Westbound				Northbound				Eastbound				
Start Time	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Total
7:00am	9	49	2	60	9	43	17	69	4	16	3	23	0	8	3	11	163
7:15	10	64	0	74	15	35	14	64	4	23	5	32	3	17	6	26	196
7:30	19	99	9	127	15	47	13	75	6	35	11	52	1	19	8	28	282
7:45	32	101	22	155	14	43	28	85	5	63	12	80	1	26	5	32	352
Hour Total	70	313	33	416	53	168	72	293	19	137	31	187	5	70	22	97	993
8:00am	24	76	7	107	14	39	39	92	7	69	14	90	3	14	6	23	312
8:15	15	65	3	83	11	32	19	62	6	79	18	103	3	18	4	25	273
8:30	13	73	1	87	20	30	15	65	5	43	5	53	4	11	3	18	223
8:45	13	59	1	73	10	27	13	50	8	29	6	43	1	9	2	12	178
Hour Total	65	273	12	350	55	128	86	269	26	220	43	289	11	52	15	78	986
Grand	135	586	45	766	108	296	158	562	45	357	74	476	16	122	37	175	1979
% of Total	6.8%	29.6%	2.3%		5.5%	15.0%	8.0%		2.3%	18.0%	3.7%		.8%	6.2%	1.9%		
Apprch %				38.7%				28.4%				24.1%				8.8%	
% of Apprch	17.6%	76.5%	5.9%		19.2%	52.7%	28.1%		9.5%	75.0%	15.5%		9.1%	69.7%	21.1%		

Peak Hour Analysis By Entire Intersection for the Period: 07:00am to 08:45am on 03/02/04

		Start	Peak Hr	.... Volumes				....	.... Percentages			....
Direction	Street Name	Peak Hour	Factor	Left	Thru	Rght	Peds	Total	Left	Thru	Rght	Peds
Southbound	EMPIRE AVE.	07:30am	.761	90	341	41	0	472	19.0	72.2	8.6	.0
Westbound	LAUREL RD.		.853	54	161	99	0	314	17.1	51.2	31.5	.0
Northbound			.789	24	246	55	0	325	7.3	75.6	16.9	.0
Eastbound			.844	8	77	23	0	108	7.4	71.2	21.2	.0





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①

All Traffic Data

CITY OF BRENTWOOD

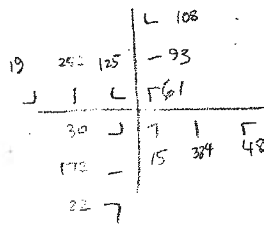
(916) 771-8700
Fax 786-2879

Site Code : 00000000
Start Date: 03/02/04
File I.D. : BRENT1
Page : 1

	EMPIRE AVE.				LAUREL RD.												
	Southbound				Westbound				Northbound				Eastbound				
Start Time	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Left	Thru	Rght	Totl	Total
4:00pm	25	70	5	100	12	23	26	61	6	79	16	101	5	38	9	52	314
4:15	36	55	3	94	13	27	23	63	3	80	14	97	8	48	6	62	316
4:30	31	55	3	89	12	25	24	61	3	85	18	106	11	42	5	58	314
4:45	35	60	4	99	13	22	33	68	5	104	11	120	8	47	8	63	350
Hour Total	127	240	15	382	50	97	106	253	17	348	59	424	32	175	28	235	1294
5:00pm	35	64	5	104	22	21	28	71	4	96	9	109	6	42	5	53	337
5:15	24	73	7	104	14	25	23	62	3	99	10	112	5	41	4	50	328
5:30	27	57	3	87	12	21	29	62	4	89	12	105	6	43	3	52	305
5:45	32	60	6	98	17	17	25	59	6	97	14	117	4	38	2	44	318
Hour Total	118	254	21	393	65	84	105	254	17	381	45	443	21	164	14	199	1289
Grand	245	494	36	775	115	181	211	507	34	729	104	867	53	339	42	434	2583
% of Total	9.5%	19.1%	1.4%		4.5%	7.0%	8.2%		1.3%	28.2%	4.0%		2.1%	13.1%	1.6%		
Apprch %				30.0%				19.6%				33.6%				16.8%	
% of Apprch	31.6%	63.7%	4.6%		22.7%	35.7%	41.6%		3.9%	84.1%	12.0%		12.2%	78.1%	9.7%		

Peak Hour Analysis By Entire Intersection for the Period: 04:00pm to 05:45pm on 03/02/04

		Start	Peak Hr	.... Volumes				....	.... Percentages			....
Direction	Street Name	Peak Hour	Factor	Left	Thru	Rght	Peds	Total	Left	Thru	Rght	Peds
Southbound	EMPIRE AVE.	04:30pm	.952	125	252	19	0	396	31.5	63.6	4.7	.0
Westbound	LAUREL RD.		.923	61	93	108	0	262	23.2	35.4	41.2	.0
Northbound			.931	15	384	48	0	447	3.3	85.9	10.7	.0
Eastbound			.889	30	172	22	0	224	13.3	76.7	9.6	.0



```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION     9 SR 160 SB Ramp/Main Street        Oakley
Count Date                   Time               Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            20   20   30
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    10 ---  1.0   1.1  1.1  1.0   1.0 ---   60  RIGHT
                                                          STREET NAME:
THRU   292 ---> 2.1  (NO. OF LANES)   2.0<---  489  THRU  Main Street

RIGHT   20 ---  1.1   1.0  1.1  1.1   2.0 ---  915  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  30   10   70                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 SB Ramp
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO        V/C
------------------------------------------------------------------------
NB  RIGHT (R)      70         70       1650     0.0424
    THRU (T)       10         10       1650     0.0061
    LEFT (L)       30         30       1650     0.0182
    T + R                     80       1650     0.0485     0.0485
------------------------------------------------------------------------
SB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)       20         20       1650     0.0121
    LEFT (L)       30         30       1650     0.0182     0.0182
    T + R                     40       1650     0.0242
------------------------------------------------------------------------
EB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)      292        292       3300     0.0885
    LEFT (L)       10         10       1650     0.0061
    T + R                    312       3300     0.0945     0.0945
------------------------------------------------------------------------
WB  RIGHT (R)      60         30 *     1650     0.0182
    THRU (T)      489        489       3300     0.1482
    LEFT (L)      915        915       3000     0.3050     0.3050
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.47
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION    10 SR 160 NB Ramp/Main Street        Oakley
Count Date                   Time               Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0    0    0
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  RIGHT
                                                          STREET NAME:
THRU   353 ---> 2.1  (NO. OF LANES)   2.0<--- 1375  THRU  Main Street

RIGHT   40 ---  1.1   1.0  0.0  2.5   1.0 ---   68  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  90    0  672                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 NB Ramp
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO        V/C
------------------------------------------------------------------------
NB  RIGHT (R)     672        548 *     3127     0.1752     0.1752
    LEFT (L)       90         90       1720     0.0523
------------------------------------------------------------------------
EB  RIGHT (R)      40         40       1720     0.0233
    THRU (T)      353        353       3440     0.1026
    T + R                    393       3440     0.1142
------------------------------------------------------------------------
WB  THRU (T)     1375       1375       3440     0.3997     0.3997
    LEFT (L)       68         68       1720     0.0395
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.57
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION    11 Neroly/Main Street                Oakley
Count Date                   Time               Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------           120   74  115
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   108 ---  1.0   1.0  1.1  2.1   1.0 ---  342  RIGHT
                                                          STREET NAME:
THRU   727 ---> 2.1  (NO. OF LANES)   3.0<--- 1123  THRU  Main Street

RIGHT  190 ---  1.1   2.0  1.1  1.1   1.0 ---   10  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 200  139   50                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Neroly
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO        V/C
------------------------------------------------------------------------
NB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)      139        139       1650     0.0842
    LEFT (L)      200        200       3000     0.0667
    T + R                    189       1650     0.1145     0.1145
------------------------------------------------------------------------
SB  RIGHT (R)     120         12 *     1650     0.0073
    THRU (T)       74         74       1650     0.0448
    LEFT (L)      115        115       3000     0.0383
    T + L                    189       3000     0.0630     0.0630
------------------------------------------------------------------------
EB  RIGHT (R)     190        190       1650     0.1152
    THRU (T)      727        727       3300     0.2203
    LEFT (L)      108        108       1650     0.0655     0.0655
    T + R                    917       3300     0.2779
------------------------------------------------------------------------
WB  RIGHT (R)     342        279 *     1650     0.1691
    THRU (T)     1123       1123       4950     0.2269     0.2269
    LEFT (L)       10         10       1650     0.0061
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.47
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION    12 Sandy Lane/Main Street            Oakley
Count Date                   Time               Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            36    3   50
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    45 ---  1.0   1.1  1.1  1.0   1.0 ---   54  RIGHT
                                                          STREET NAME:
THRU   837 ---> 2.1  (NO. OF LANES)   2.0<--- 1428  THRU  Main Street

RIGHT   10 ---  1.1   1.0  1.1  1.1   1.0 ---   10  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  10    3   10                         Urb=N, Rur=N
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Sandy Lane
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO        V/C
------------------------------------------------------------------------
NB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)        3          3       1650     0.0018
    LEFT (L)       10         10       1650     0.0061
    T + R                     13       1650     0.0079     0.0079
------------------------------------------------------------------------
SB  RIGHT (R)      36         36       1650     0.0218
    THRU (T)        3          3       1650     0.0018
    LEFT (L)       50         50       1650     0.0303     0.0303
    T + R                     39       1650     0.0236
------------------------------------------------------------------------
EB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      837        837       3300     0.2536
    LEFT (L)       45         45       1650     0.0273     0.0273
    T + R                    847       3300     0.2567
------------------------------------------------------------------------
WB  RIGHT (R)      54          4 *     1650     0.0024
    THRU (T)     1428       1428       3300     0.4327     0.4327
    LEFT (L)       10         10       1650     0.0061
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.50
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION    13 Live Oak/Main Street              Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            29  134   56
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    44 ---  1.0   1.1  2.1  2.0   1.0 ---   66  RIGHT
                                                          STREET NAME:
THRU   820 ---> 2.1  (NO. OF LANES)   2.0<--- 1395  THRU  Main Street

RIGHT   52 ---  1.1   1.0  2.1  1.1   1.0 ---   37  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 104  167   37                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      37         37       1650     0.0224
    THRU (T)      167        167       3300     0.0506
    LEFT (L)      104        104       1650     0.0630     0.0630
    T + R                    204       3300     0.0618
------------------------------------------------------------------------
SB  RIGHT (R)      29         29       1650     0.0176
    THRU (T)      134        134       3300     0.0406
    LEFT (L)       56         56       3000     0.0187
    T + R                    163       3300     0.0494     0.0494
------------------------------------------------------------------------
EB  RIGHT (R)      52         52       1650     0.0315
    THRU (T)      820        820       3300     0.2485
    LEFT (L)       44         44       1650     0.0267     0.0267
    T + R                    872       3300     0.2642
------------------------------------------------------------------------
WB  RIGHT (R)      66         35 *     1650     0.0212
    THRU (T)     1395       1395       3300     0.4227     0.4227
    LEFT (L)       37         37       1650     0.0224
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.56
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION    14 Big Break/Main Street             Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------           210   40   60
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    81 ---  1.0   1.0  1.1  1.1   1.0 ---   60  RIGHT
                                                          STREET NAME:
THRU   805 ---> 2.0  (NO. OF LANES)   2.0<--- 1203  THRU  Main Street

RIGHT   30 ---  1.0   1.0  1.1  1.1   1.0 ---   50  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  60   20   30                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Big Break
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      30         30       1650     0.0182
    THRU (T)       20         20       1650     0.0121
    LEFT (L)       60         60       1650     0.0364     0.0364
    T + R                     50       1650     0.0303
------------------------------------------------------------------------
SB  RIGHT (R)     210        129 *     1650     0.0782     0.0782
    THRU (T)       40         40       1650     0.0242
    LEFT (L)       60         60       1650     0.0364
    T + L                    100       1650     0.0606
------------------------------------------------------------------------
EB  RIGHT (R)      30          0 *     1650     0.0000
    THRU (T)      805        805       3300     0.2439
    LEFT (L)       81         81       1650     0.0491     0.0491
------------------------------------------------------------------------
WB  RIGHT (R)      60          0 *     1650     0.0000
    THRU (T)     1203       1203       3300     0.3645     0.3645
    LEFT (L)       50         50       1650     0.0303
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.53
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION    17 Empire Ave/Oakley Road            Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------            60  237   40
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? Y
LEFT    60 ---  2.1   1.0  1.0  1.0   1.0 ---   20  RIGHT
                                                          STREET NAME:
THRU    10 ---> 1.1  (NO. OF LANES)   1.1<---   10  THRU  Oakley Road

RIGHT  145 ---  1.0   1.0  2.1  1.1   1.1 ---   20  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 213  314   10                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire Ave
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      314        314       3300     0.0952
    LEFT (L)      213        213       1650     0.1291     0.1291
    T + R                    324       3300     0.0982
------------------------------------------------------------------------
SB  RIGHT (R)      60         27 *     1650     0.0164
    THRU (T)      237        237       1650     0.1436     0.1436
    LEFT (L)       40         40       1650     0.0242
------------------------------------------------------------------------
EB  RIGHT (R)     145          0 *     1650     0.0000
    THRU (T)       10         10       1650     0.0061
    LEFT (L)       60         60       3000     0.0200
    T + L                     70       3000     0.0233     0.0233
------------------------------------------------------------------------
WB  RIGHT (R)      20          0 *     1650     0.0000
    THRU (T)       10         10       1650     0.0061
    LEFT (L)       20         20       1650     0.0121
    T + L                     30       1650     0.0182     0.0182
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.31
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION    18 Empire Avenue/Main Street         Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------            40   50   20
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    20 ---  1.0   1.0  1.1  1.1   1.1 ---   10  RIGHT
                                                          STREET NAME:
THRU   718 ---> 2.0  (NO. OF LANES)   2.1<---  923  THRU  Main Street

RIGHT  157 ---  1.0   2.0  1.0  1.0   1.0 ---  130  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 284   10  100                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Empire Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     100          0 *     1650     0.0000
    THRU (T)       10         10       1650     0.0061
    LEFT (L)      284        284       3000     0.0947     0.0947
------------------------------------------------------------------------
SB  RIGHT (R)      40         20 *     1650     0.0121
    THRU (T)       50         50       1650     0.0303
    LEFT (L)       20         20       1650     0.0121
    T + L                     70       1650     0.0424     0.0424
------------------------------------------------------------------------
EB  RIGHT (R)     157          1 *     1650     0.0006
    THRU (T)      718        718       3300     0.2176     0.2176
    LEFT (L)       20         20       1650     0.0121
------------------------------------------------------------------------
WB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      923        923       3300     0.2797
    LEFT (L)      130        130       1650     0.0788     0.0788
    T + R                    933       3300     0.2827
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.43
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION    19 Vintage/Main Street               Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------           157    0  180
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    76 ---  1.0   1.0  0.0  1.0   1.1 ---  100  RIGHT
                                                          STREET NAME:
THRU   742 ---> 2.0  (NO. OF LANES)   2.1<---  886  THRU  Main Street

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Vintage
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)     157         81 *     1720     0.0471
    LEFT (L)      180        180       1720     0.1047     0.1047
------------------------------------------------------------------------
EB  THRU (T)      742        742       3440     0.2157
    LEFT (L)       76         76       1720     0.0442     0.0442
------------------------------------------------------------------------
WB  RIGHT (R)     100        100       1720     0.0581
    THRU (T)      886        886       3440     0.2576
    T + R                    986       3440     0.2866     0.2866
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.44
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION    20 O'Hara Avenue/Main Street         Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------             5    0    5
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     5 ---  1.0   1.1  1.1  1.1   1.1 ---    5  RIGHT
                                                          STREET NAME:
THRU   754 ---> 1.0  (NO. OF LANES)   1.1<---  854  THRU  Main Street

RIGHT  118 ---  1.0   1.0  1.1  1.1   1.0 ---   30  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 122    0   30                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: O'Hara Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      30         30       1650     0.0182
    THRU (T)        0          0       1650     0.0000
    LEFT (L)      122        122       1650     0.0739     0.0739
    T + R                     30       1650     0.0182
------------------------------------------------------------------------
SB  RIGHT (R)       5          5       1650     0.0030
    THRU (T)        0          0       1650     0.0000
    LEFT (L)        5          5       1650     0.0030
    T + R                      5       1650     0.0030
    T + L                      5       1650     0.0030
    T + R + L                 10       1650     0.0061     0.0061
------------------------------------------------------------------------
EB  RIGHT (R)     118          0 *     1650     0.0000
    THRU (T)      754        754       1650     0.4570
    LEFT (L)        5          5       1650     0.0030     0.0030
------------------------------------------------------------------------
WB  RIGHT (R)       5          5       1650     0.0030
    THRU (T)      854        854       1650     0.5176
    LEFT (L)       30         30       1650     0.0182
    T + R                    859       1650     0.5206     0.5206
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.60
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION    21 Empire Avenue/Cypress Road        Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0  308  114
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  2.0  1.0   1.0 ---  201  RIGHT
                                                          STREET NAME:
THRU     0 ---> 0.0  (NO. OF LANES)   0.0<---    0  THRU  Cypress Road

RIGHT    0 ---  0.0   0.0  2.1  1.1   1.0 ---  150  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0  297  100                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     100        100       1720     0.0581
    THRU (T)      297        297       3440     0.0863
    T + R                    397       3440     0.1154     0.1154
------------------------------------------------------------------------
SB  THRU (T)      308        308       3440     0.0895
    LEFT (L)      114        114       1720     0.0663     0.0663
------------------------------------------------------------------------
WB  RIGHT (R)     201         87 *     1720     0.0506
    LEFT (L)      150        150       1720     0.0872     0.0872
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.27
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION    22 Main Street/Cypress               Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            10  410  354
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    40 ---  1.0   1.1  2.1  2.0   2.1 ---  380  RIGHT
                                                          STREET NAME:
THRU   129 ---> 2.1  (NO. OF LANES)   1.1<---  150  THRU  Cypress

RIGHT   60 ---  1.1   1.0  2.0  1.0   1.0 ---  100  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  30  454  110                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Main Street
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     110         10 *     1650     0.0061
    THRU (T)      454        454       3300     0.1376     0.1376
    LEFT (L)       30         30       1650     0.0182
------------------------------------------------------------------------
SB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      410        410       3300     0.1242
    LEFT (L)      354        354       3000     0.1180     0.1180
    T + R                    420       3300     0.1273
------------------------------------------------------------------------
EB  RIGHT (R)      60         60       1650     0.0364
    THRU (T)      129        129       3300     0.0391
    LEFT (L)       40         40       1650     0.0242     0.0242
    T + R                    189       3300     0.0573
------------------------------------------------------------------------
WB  RIGHT (R)     380        185 *     3000     0.0617
    THRU (T)      150        150       1650     0.0909
    LEFT (L)      100        100       1650     0.0606
    T + R                    335       3000     0.1117     0.1117
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.39
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION    24 Live Oak/Laurel                   Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------           305    0  105
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   312 ---  2.0   1.0  0.0  1.0   1.1 ---   88  RIGHT
                                                          STREET NAME:
THRU   620 ---> 3.0  (NO. OF LANES)   3.1<---  900  THRU  Laurel

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)     305        133 *     1720     0.0773     0.0773
    LEFT (L)      105        105       1720     0.0610
------------------------------------------------------------------------
EB  THRU (T)      620        620       5160     0.1202
    LEFT (L)      312        312       3127     0.0998     0.0998
------------------------------------------------------------------------
WB  RIGHT (R)      88         88       1720     0.0512
    THRU (T)      900        900       5160     0.1744
    T + R                    988       5160     0.1915     0.1915
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.37
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION    25 Empire/Laurel                     Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------           220  238   51
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   170 ---  1.0   1.1  2.1  1.0   1.1 ---   41  RIGHT
                                                          STREET NAME:
THRU   405 ---> 2.1  (NO. OF LANES)   2.1<---  708  THRU  Laurel

RIGHT  150 ---  1.1   1.0  2.1  1.1   1.0 ---   50  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  60  116   30                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      30         30       1650     0.0182
    THRU (T)      116        116       3300     0.0352
    LEFT (L)       60         60       1650     0.0364     0.0364
    T + R                    146       3300     0.0442
------------------------------------------------------------------------
SB  RIGHT (R)     220        220       1650     0.1333
    THRU (T)      238        238       3300     0.0721
    LEFT (L)       51         51       1650     0.0309
    T + R                    458       3300     0.1388     0.1388
------------------------------------------------------------------------
EB  RIGHT (R)     150        150       1650     0.0909
    THRU (T)      405        405       3300     0.1227
    LEFT (L)      170        170       1650     0.1030     0.1030
    T + R                    555       3300     0.1682
------------------------------------------------------------------------
WB  RIGHT (R)      41         41       1650     0.0248
    THRU (T)      708        708       3300     0.2145
    LEFT (L)       50         50       1650     0.0303
    T + R                    749       3300     0.2270     0.2270
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.51
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION    26 Bridgehead/Proj Dwy               Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0  245   48
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  1.0  1.0   1.0 ---   39  RIGHT
                                                          STREET NAME:
THRU     0 ---> 0.0  (NO. OF LANES)   0.0<---    0  THRU  Proj Dwy

RIGHT    0 ---  0.0   0.0  1.0  1.0   1.0 ---   64  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0  512   77                         Urb=N, Rur=N
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Bridgehead
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      77         13 *     1720     0.0076
    THRU (T)      512        512       1720     0.2977     0.2977
------------------------------------------------------------------------
SB  THRU (T)      245        245       1720     0.1424
    LEFT (L)       48         48       1720     0.0279     0.0279
------------------------------------------------------------------------
WB  RIGHT (R)      39          0 *     1720     0.0000
    LEFT (L)       64         64       1720     0.0372     0.0372
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.36
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION    27 Proj Dwy Center/Main Street       Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------            24    0   48
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    29 ---  1.0   1.0  0.0  1.0   1.0 ---   58  RIGHT
                                                          STREET NAME:
THRU   858 ---> 2.0  (NO. OF LANES)   2.0<--- 1459  THRU  Main Street

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=N, Rur=N
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Proj Dwy Center
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)      24          0 *     1720     0.0000
    LEFT (L)       48         48       1720     0.0279     0.0279
------------------------------------------------------------------------
EB  THRU (T)      858        858       3440     0.2494
    LEFT (L)       29         29       1720     0.0169     0.0169
------------------------------------------------------------------------
WB  RIGHT (R)      58         10 *     1720     0.0058
    THRU (T)     1459       1459       3440     0.4241     0.4241
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.47
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION    28 Proj Dwy East/Main Street         Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------            32    0   25
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    32 ---  1.0   1.0  0.0  1.0   1.0 ---   38  RIGHT
                                                          STREET NAME:
THRU   851 ---> 2.0  (NO. OF LANES)   2.0<--- 1435  THRU  Main Street

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=N, Rur=N
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Proj Dwy East
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)      32          0 *     1720     0.0000
    LEFT (L)       25         25       1720     0.0145     0.0145
------------------------------------------------------------------------
EB  THRU (T)      851        851       3440     0.2474
    LEFT (L)       32         32       1720     0.0186     0.0186
------------------------------------------------------------------------
WB  RIGHT (R)      38         13 *     1720     0.0076
    THRU (T)     1435       1435       3440     0.4172     0.4172
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.45
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION    29 Live Oak/Proj Dwy                 Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       2-PHASE SIGNAL
-----------             0    0    0
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  RIGHT
                                                          STREET NAME:
THRU    20 ---> 1.0  (NO. OF LANES)   1.0<---   20  THRU  Proj Dwy

RIGHT  168 ---  1.0   2.0  0.0  1.0   1.0 ---   51  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 214    0   62                         Urb=N, Rur=N
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      62         11 *     1800     0.0061
    LEFT (L)      214        214       3273     0.0654     0.0654
------------------------------------------------------------------------
EB  RIGHT (R)     168         50 *     1800     0.0278     0.0278
    THRU (T)       20         20       1800     0.0111
------------------------------------------------------------------------
WB  THRU (T)       20         20       1800     0.0111
    LEFT (L)       51         51       1800     0.0283     0.0283
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.12
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.AM,CAP=
```

Near Term (2010) With Project PM

HCM Signalized Intersection Capacity Analysis — 2010 & Proj PM
1: Wilbur Avenue & Minaker Drive — 11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↰↑	↱		↰↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	0.96		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (prot)	1770	3393		1770	3516			1770	1583		1817	1583
Flt Permitted	0.95	1.00		0.95	1.00			0.74	1.00		0.86	1.00
Satd. Flow (perm)	1770	3393		1770	3516			1384	1583		1594	1583
Volume (vph)	10	421	160	30	221	10	60	0	40	10	10	20
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	11	468	178	33	246	11	67	0	44	11	11	22
RTOR Reduction (vph)	0	38	0	0	3	0	0	0	38	0	0	19
Lane Group Flow (vph)	11	608	0	33	254	0	0	67	6	0	22	3
Turn Type	Prot			Prot			Perm		Perm	Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		4
Actuated Green, G (s)	1.5	35.2		1.8	35.5			8.0	8.0		8.0	8.0
Effective Green, g (s)	1.5	35.2		1.8	35.5			8.0	8.0		8.0	8.0
Actuated g/C Ratio	0.03	0.62		0.03	0.62			0.14	0.14		0.14	0.14
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	47	2095		56	2190			194	222		224	222
v/s Ratio Prot	0.01	c0.18		c0.02	0.07							
v/s Ratio Perm								c0.05	0.00		0.01	0.00
v/c Ratio	0.23	0.29		0.59	0.12			0.35	0.03		0.10	0.01
Uniform Delay, d1	27.2	5.1		27.2	4.4			22.1	21.1		21.4	21.1
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	2.6	0.1		14.9	0.0			1.1	0.1		0.2	0.0
Delay (s)	29.7	5.2		42.1	4.4			23.2	21.2		21.5	21.1
Level of Service	C	A		D	A			C	C		C	C
Approach Delay (s)		5.6			8.7			22.4			21.3	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	8.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	57.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	40.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis — 2010 & Proj PM
2: Wilbur Avenue & Viera Avenue — 11/6/2006

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱		↰	↑	↰↱	
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	429	120	19	219	40	19
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	447	125	20	228	42	20
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			572		777	509
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			572		777	509
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		88	96
cM capacity (veh/h)			1001		358	564

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	572	20	228	61
Volume Left	0	20	0	42
Volume Right	125	0	0	20
cSH	1700	1001	1700	406
Volume to Capacity	0.34	0.02	0.13	0.15
Queue Length 95th (ft)	0	2	0	13
Control Delay (s)	0.0	8.7	0.0	15.4
Lane LOS		A		C
Approach Delay (s)	0.0	0.7		15.4
Approach LOS				C

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	39.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis — 2010 & Proj PM
3: Wilbur Avenue & SR 160 SB Off — 11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱		↰	↑↑					↰		↱
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	488	90	30	178	0	0	0	0	230	0	60
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	542	100	33	198	0	0	0	0	256	0	67
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	198			642			758	857	592	857	907	99
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	198			642			758	857	592	857	907	99
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			96			100	100	100	0	100	93
cM capacity (veh/h)	1372			938			268	283	449	244	265	938

Direction, Lane #	EB 1	WB 1	WB 2	WB 3	SB 1	SB 2
Volume Total	642	33	99	99	256	67
Volume Left	0	33	0	0	256	0
Volume Right	100	0	0	0	0	67
cSH	1700	938	1700	1700	244	938
Volume to Capacity	0.38	0.04	0.06	0.06	1.05	0.07
Queue Length 95th (ft)	0	3	0	0	263	6
Control Delay (s)	0.0	9.0	0.0	0.0	114.1	9.1
Lane LOS		A			F	A
Approach Delay (s)	0.0	1.3			92.4	
Approach LOS					F	

Intersection Summary			
Average Delay	25.1		
Intersection Capacity Utilization	57.2%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis — 2010 & Proj PM
4: Wilbur Avenue & SR 160 NB On — 11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑			↑↱		↰		↱			
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	260	458	0	0	198	161	10	0	20	0	0	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	289	509	0	0	220	179	11	0	22	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	399			509			1197	1486	254	1142	1396	199
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	399			509			1197	1486	254	1142	1396	199
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	75			100			90	100	97	100	100	100
cM capacity (veh/h)	1156			1052			114	93	745	122	105	808

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2
Volume Total	289	254	254	147	252	11	22
Volume Left	289	0	0	0	0	11	0
Volume Right	0	0	0	0	179	0	22
cSH	1156	1700	1700	1700	1700	114	745
Volume to Capacity	0.25	0.15	0.15	0.09	0.15	0.10	0.03
Queue Length 95th (ft)	25	0	0	0	0	8	2
Control Delay (s)	9.1	0.0	0.0	0.0	0.0	39.9	10.0
Lane LOS	A					E	A
Approach Delay (s)	3.3			0.0		19.9	
Approach LOS						C	

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	57.2%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
5: Wilbur Avenue & Bridgehead Road

2010 & Proj PM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	30	0	448	0	0	0	309	40	0	0	30	50
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	0	472	0	0	0	325	42	0	0	32	53

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1
Volume Total (vph)	32	472	0	367	84
Volume Left (vph)	32	0	0	325	0
Volume Right (vph)	0	472	0	0	53
Hadj (s)	0.53	-0.67	0.00	0.21	-0.34
Departure Headway (s)	6.3	5.1	6.1	5.6	5.5
Degree Utilization, x	0.06	0.67	0.00	0.57	0.13
Capacity (veh/h)	544	675	518	613	584
Control Delay (s)	8.5	16.7	9.1	15.6	9.3
Approach Delay (s)	16.2		0.0	15.6	9.3
Approach LOS	C		A	C	A

Intersection Summary			
Delay	15.4		
HCM Level of Service	C		
Intersection Capacity Utilization	60.3%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
6: E 18th Street & Hillcrest Avenue

2010 & Proj PM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑	↱	↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3360		1770	3494		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3360		1770	3494		1770	1863	1583	1770	1863	1583
Volume (vph)	40	451	230	371	431	40	170	150	311	60	120	30
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	42	470	240	386	449	42	177	156	324	62	125	31
RTOR Reduction (vph)	0	60	0	0	6	0	0	0	231	0	0	27
Lane Group Flow (vph)	42	650	0	386	485	0	177	156	93	62	125	4
Turn Type	Prot			Prot			Split		Perm	Split		Perm
Protected Phases	1	6		5	2		8	8		4	4	
Permitted Phases									8			4
Actuated Green, G (s)	2.6	20.9		20.7	39.0		13.4	13.4	13.4	8.8	8.8	8.8
Effective Green, g (s)	3.6	22.9		21.7	41.0		14.9	14.9	14.9	10.3	10.3	10.3
Actuated g/C Ratio	0.04	0.28		0.27	0.50		0.18	0.18	0.18	0.13	0.13	0.13
Clearance Time (s)	4.0	5.0		4.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	78	941		470	1751		322	339	288	223	235	199
v/s Ratio Prot	0.02	c0.19		c0.22	0.14		c0.10	0.08		0.04	c0.07	
v/s Ratio Perm									0.06			0.00
v/c Ratio	0.54	0.69		0.82	0.28		0.55	0.46	0.32	0.28	0.53	0.02
Uniform Delay, d1	38.3	26.3		28.2	11.8		30.4	29.9	29.1	32.4	33.5	31.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.0	2.2		11.0	0.1		1.9	1.0	0.7	0.7	2.3	0.0
Delay (s)	45.3	28.5		39.2	11.9		32.3	30.9	29.7	33.1	35.8	31.4
Level of Service	D	C		D	B		C	C	C	C	D	C
Approach Delay (s)		29.4			23.9			30.7			34.4	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	28.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	81.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
7: E 18th Street & Viera Avenue

2010 & Proj PM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↱			↰↑	↱		✣	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	0.99			1.00	0.85		0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00		0.98	
Satd. Flow (prot)	1770	3539	1583	1770	1847			1783	1583		1745	
Flt Permitted	0.28	1.00	1.00	0.36	1.00			0.65	1.00		0.85	
Satd. Flow (perm)	526	3539	1583	665	1847			1217	1583		1516	
Volume (vph)	60	673	110	10	614	36	90	10	20	76	60	70
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	63	708	116	11	646	38	95	11	21	80	63	74
RTOR Reduction (vph)	0	0	46	0	3	0	0	0	15	0	35	0
Lane Group Flow (vph)	63	708	70	11	681	0	0	106	6	0	182	0
Turn Type	Perm		Perm	Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	26.0	26.0	26.0	26.0	26.0			10.7	10.7		10.7	
Effective Green, g (s)	28.0	28.0	28.0	28.0	28.0			12.7	12.7		12.7	
Actuated g/C Ratio	0.60	0.60	0.60	0.60	0.60			0.27	0.27		0.27	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	315	2122	949	399	1107			331	430		412	
v/s Ratio Prot		0.20			c0.37							
v/s Ratio Perm	0.12		0.04	0.02				0.09	0.00		c0.12	
v/c Ratio	0.20	0.33	0.07	0.03	0.61			0.32	0.01		0.44	
Uniform Delay, d1	4.3	4.7	3.9	3.8	5.9			13.6	12.4		14.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.3	0.1	0.0	0.0	1.0			0.6	0.0		0.8	
Delay (s)	4.6	4.8	3.9	3.8	7.0			14.1	12.4		14.8	
Level of Service	A	A	A	A	A			B	B		B	
Approach Delay (s)		4.7			6.9			13.8			14.8	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	7.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	46.7	Sum of lost time (s)	6.0
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: E 18th Street & Phillips Lane

2010 & Proj PM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱	↰	↱		↰↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.97	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.90		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3531		1770	3539	1583	1770	1682		3433	1600	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3531		1770	3539	1583	1770	1682		3433	1600	
Volume (vph)	140	639	10	10	510	120	10	10	20	130	10	160
Peak-hour factor, PHF	0.92	0.98	0.98	0.98	0.98	0.92	0.98	0.92	0.98	0.92	0.92	0.92
Adj. Flow (vph)	152	652	10	10	520	130	10	11	20	141	11	174
RTOR Reduction (vph)	0	1	0	0	0	90	0	18	0	0	149	0
Lane Group Flow (vph)	152	661	0	10	520	40	10	13	0	141	36	0
Turn Type	Prot			Prot		Perm	Split			Split		
Protected Phases	5	2		1	6		7	7		3	3	
Permitted Phases						6						
Actuated Green, G (s)	7.1	22.7		0.7	16.3	16.3	6.2	6.2		7.7	7.7	
Effective Green, g (s)	7.1	22.7		0.7	16.3	16.3	6.2	6.2		7.7	7.7	
Actuated g/C Ratio	0.13	0.43		0.01	0.31	0.31	0.12	0.12		0.14	0.14	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	236	1504		23	1082	484	206	196		496	231	
v/s Ratio Prot	c0.09	c0.19		0.01	0.15		0.01	c0.01		c0.04	0.02	
v/s Ratio Perm						0.03						
v/c Ratio	0.64	0.44		0.43	0.48	0.08	0.05	0.07		0.28	0.16	
Uniform Delay, d1	21.9	10.8		26.1	15.1	13.2	20.9	21.0		20.3	20.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.9	0.2		12.6	0.3	0.1	0.1	0.1		0.3	0.3	
Delay (s)	27.8	11.0		38.7	15.4	13.2	21.0	21.1		20.7	20.3	
Level of Service	C	B		D	B	B	C	C		C	C	
Approach Delay (s)		14.1			15.3			21.1			20.4	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM Average Control Delay	15.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	53.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	42.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
9: E 18th Street & SR 160 SB Off

2010 & Proj PM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰↰	↑↑	↗	↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.87		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3399		3335	3438	1538	1719	1572		1719	1700	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.72	1.00		0.33	1.00	
Satd. Flow (perm)	1719	3399		3335	3438	1538	1308	1572		591	1700	
Volume (vph)	30	729	60	592	560	100	40	20	141	80	30	20
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	31	759	62	617	583	104	42	21	147	83	31	21
RTOR Reduction (vph)	0	4	0	0	0	28	0	130	0	0	19	0
Lane Group Flow (vph)	31	817	0	617	583	76	42	38	0	83	33	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases						6	8			4		
Actuated Green, G (s)	6.6	59.9		33.2	86.5	86.5	13.9	13.9		13.9	13.9	
Effective Green, g (s)	6.6	60.9		33.2	87.5	87.5	13.9	13.9		13.9	13.9	
Actuated g/C Ratio	0.05	0.51		0.28	0.73	0.73	0.12	0.12		0.12	0.12	
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	4.0	4.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	95	1725		923	2507	1121	152	182		68	197	
v/s Ratio Prot	0.02	c0.24		c0.19	0.17			0.02			0.02	
v/s Ratio Perm						0.05	0.03			c0.14		
v/c Ratio	0.33	0.47		0.67	0.23	0.07	0.28	0.21		1.22	0.17	
Uniform Delay, d1	54.6	19.2		38.5	5.3	4.6	48.5	48.1		53.0	47.8	
Progression Factor	1.00	1.00		0.81	0.43	0.14	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	0.9		1.7	0.2	0.1	0.4	0.2		180.0	0.1	
Delay (s)	56.6	20.1		32.8	2.5	0.7	48.8	48.3		233.1	48.0	
Level of Service	E	C		C	A	A	D	D		F	D	
Approach Delay (s)		21.4			16.7			48.4			161.8	
Approach LOS		C			B			D			F	

Intersection Summary			
HCM Average Control Delay	28.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Main Street & SR 160 NB On

2010 & Proj PM
11/6/2006

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↱		↰	↑↑	↰	↗↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	1.00	0.88
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3411		1719	3438	1719	2707
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3411		1719	3438	1719	2707
Volume (vph)	900	50	81	1162	90	1350
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	938	52	84	1210	94	1406
RTOR Reduction (vph)	3	0	0	0	0	21
Lane Group Flow (vph)	987	0	84	1210	94	1385
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Turn Type			Prot			pm+ov
Protected Phases	2		1	6	8	1
Permitted Phases						8
Actuated Green, G (s)	40.5		57.0	101.5	9.5	66.5
Effective Green, g (s)	41.5		57.0	102.5	9.5	66.5
Actuated g/C Ratio	0.35		0.48	0.85	0.08	0.55
Clearance Time (s)	5.0		4.0	5.0	4.0	4.0
Vehicle Extension (s)	4.0		3.0	4.0	2.0	3.0
Lane Grp Cap (vph)	1180		817	2937	136	1590
v/s Ratio Prot	c0.29		0.05	0.35	0.05	c0.41
v/s Ratio Perm						0.10
v/c Ratio	0.84		0.10	0.41	0.69	0.87
Uniform Delay, d1	36.1		17.4	2.0	53.8	23.1
Progression Factor	0.85		0.70	0.30	1.00	1.00
Incremental Delay, d2	6.5		0.1	0.4	11.5	5.5
Delay (s)	37.1		12.3	1.0	65.4	28.6
Level of Service	D		B	A	E	C
Approach Delay (s)	37.1			1.7	30.9	
Approach LOS	D			A	C	

Intersection Summary			
HCM Average Control Delay	22.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	80.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Main Street & Bridgehead Road

2010 & Proj PM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑↑	↗	↰↰	↱		↰	↖	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.91	1.00	0.97	1.00		0.95	0.95	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (prot)	1719	3340		1719	4940	1538	3335	1736		1633	1692	1538
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (perm)	1719	3340		1719	4940	1538	3335	1736		1633	1692	1538
Volume (vph)	188	1671	390	30	851	181	220	160	60	280	151	172
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	192	1705	398	31	868	185	224	163	61	286	154	176
RTOR Reduction (vph)	0	16	0	0	0	76	0	11	0	0	0	66
Lane Group Flow (vph)	192	2087	0	31	868	109	224	213	0	214	226	110
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot		pm+ov	Split			Split		pm+ov
Protected Phases	5	2		1	6	7	8	8		7	7	5
Permitted Phases						6						7
Actuated Green, G (s)	16.9	69.1		3.6	55.8	69.8	16.3	16.3		14.0	14.0	30.9
Effective Green, g (s)	16.9	70.1		3.6	56.8	70.8	16.3	16.3		14.0	14.0	30.9
Actuated g/C Ratio	0.14	0.58		0.03	0.47	0.59	0.14	0.14		0.12	0.12	0.26
Clearance Time (s)	4.0	5.0		4.0	5.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	2.0	4.0		2.0	4.0	2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	242	1951		52	2338	907	453	236		191	197	447
v/s Ratio Prot	0.11	c0.62		0.02	c0.18	0.01	0.07	c0.12		0.13	c0.13	0.03
v/s Ratio Perm						0.06						0.04
v/c Ratio	0.79	1.07		0.60	0.37	0.12	0.49	0.90		1.12	1.15	0.25
Uniform Delay, d1	49.9	25.0		57.5	20.2	10.9	48.0	51.1		53.0	53.0	35.3
Progression Factor	0.98	0.96		0.59	0.16	0.16	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	7.9	37.2		10.6	0.4	0.0	0.3	32.9		101.2	109.4	0.1
Delay (s)	56.7	61.2		44.7	3.6	1.8	48.3	83.9		154.2	162.4	35.4
Level of Service	E	E		D	A	A	D	F		F	F	D
Approach Delay (s)		60.9			4.4			66.1			123.2	
Approach LOS		E			A			E			F	

Intersection Summary			
HCM Average Control Delay	56.3	HCM Level of Service	E
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	100.8%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Main Street & Sandy Lane

2010 & Proj PM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↗	↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.92		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3435		1719	3438	1583	1719	1680		1770	1599	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3435		1719	3438	1583	1719	1680		1770	1599	
Volume (vph)	160	1842	10	10	927	144	10	7	10	194	7	125
Peak-hour factor, PHF	0.92	0.96	0.96	0.96	0.96	0.92	0.96	0.92	0.96	0.92	0.92	0.92
Adj. Flow (vph)	174	1919	10	10	966	157	10	8	10	211	8	136
RTOR Reduction (vph)	0	0	0	0	0	76	0	10	0	0	117	0
Lane Group Flow (vph)	174	1929	0	10	966	81	10	8	0	211	27	0
Heavy Vehicles (%)	2%	5%	5%	5%	5%	2%	5%	2%	5%	2%	2%	2%
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6						
Actuated Green, G (s)	23.2	83.6		0.8	61.2	61.2	0.8	4.6		13.0	15.8	
Effective Green, g (s)	23.2	84.6		0.8	62.2	62.2	1.8	4.6		14.0	16.8	
Actuated g/C Ratio	0.19	0.70		0.01	0.52	0.52	0.02	0.04		0.12	0.14	
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0	5.0	4.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	342	2422		11	1782	821	26	64		207	224	
v/s Ratio Prot	0.10	c0.56		0.01	c0.28		0.01	0.00		c0.12	c0.02	
v/s Ratio Perm						0.05						
v/c Ratio	0.51	0.80		0.91	0.54	0.10	0.38	0.13		1.02	0.12	
Uniform Delay, d1	43.3	11.9		59.6	19.4	14.7	58.6	55.8		53.0	45.1	
Progression Factor	0.65	0.13		1.22	0.54	1.07	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.3		205.3	1.1	0.2	9.2	0.9		67.7	0.2	
Delay (s)	28.2	1.8		277.9	11.5	15.9	67.8	56.7		120.7	45.4	
Level of Service	C	A		F	B	B	E	E		F	D	
Approach Delay (s)		3.9			14.5			60.7			90.1	
Approach LOS		A			B			E			F	

Intersection Summary			
HCM Average Control Delay	16.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
13: Main Street & Live Oak Ave

2010 & Proj PM
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱	↰	↑↱		↰↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		0.97	0.95	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3412		1719	3438	1583	1719	3453		3433	3403	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3412		1719	3438	1583	1719	3453		3433	3403	
Volume (vph)	147	1861	101	37	945	179	78	343	54	198	341	117
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	152	1919	104	38	974	185	80	354	56	204	352	121
RTOR Reduction (vph)	0	3	0	0	0	94	0	10	0	0	29	0
Lane Group Flow (vph)	152	2020	0	38	974	91	80	400	0	204	444	0
Heavy Vehicles (%)	2%	5%	5%	5%	5%	2%	5%	2%	5%	2%	2%	2%
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6						
Actuated Green, G (s)	18.8	74.7		3.2	59.1	59.1	7.8	18.1		8.0	18.3	
Effective Green, g (s)	18.8	74.7		3.2	59.1	59.1	7.8	18.1		8.0	18.3	
Actuated g/C Ratio	0.16	0.62		0.03	0.49	0.49	0.06	0.15		0.07	0.15	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	277	2124		46	1693	780	112	521		229	519	
v/s Ratio Prot	0.09	c0.59		0.02	c0.28		0.05	c0.12		0.06	c0.13	
v/s Ratio Perm						0.06						
v/c Ratio	0.55	0.95		0.83	0.58	0.12	0.71	0.77		0.89	0.86	
Uniform Delay, d1	46.7	21.0		58.1	21.6	16.4	55.0	48.9		55.6	49.6	
Progression Factor	0.82	0.60		1.26	0.46	0.34	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.4	7.9		66.4	1.3	0.3	19.3	6.7		32.0	13.0	
Delay (s)	39.6	20.4		139.8	11.1	5.9	74.4	55.6		87.6	62.6	
Level of Service	D	C		F	B	A	E	E		F	E	
Approach Delay (s)		21.7			14.4			58.7			70.1	
Approach LOS		C			B			E			E	

Intersection Summary			
HCM Average Control Delay	31.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
14: Main Street & Big Break Road

2010 & Proj PM
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↱			↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.98	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1647			1765	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.63	1.00			0.43	1.00
Satd. Flow (perm)	1719	3438	1538	1719	3438	1538	1138	1647			774	1538
Volume (vph)	297	1644	170	70	946	60	70	60	90	40	40	141
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	316	1749	181	74	1006	64	74	64	96	43	43	150
RTOR Reduction (vph)	0	0	39	0	0	27	0	49	0	0	0	134
Lane Group Flow (vph)	316	1749	142	74	1006	37	74	111	0	0	86	17
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot		custom	Prot		custom	Perm			Perm		Perm
Protected Phases	5			1				3			7	
Permitted Phases		2	2		6	6	3			7		7
Actuated Green, G (s)	35.8	85.7	85.7	8.1	57.0	57.0	13.2	13.2			13.2	13.2
Effective Green, g (s)	36.8	86.7	86.7	8.1	58.0	58.0	13.2	13.2			13.2	13.2
Actuated g/C Ratio	0.31	0.72	0.72	0.07	0.48	0.48	0.11	0.11			0.11	0.11
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	527	2484	1111	116	1662	743	125	181			85	169
v/s Ratio Prot	0.18			0.04				0.07				
v/s Ratio Perm		c0.51	0.09		c0.29	0.02	0.07				c0.11	0.01
v/c Ratio	0.60	0.70	0.13	0.64	0.61	0.05	0.59	0.61			1.01	0.10
Uniform Delay, d1	35.3	9.4	5.1	54.5	22.6	16.4	50.8	51.0			53.4	48.0
Progression Factor	0.74	0.29	0.01	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	0.8	1.2	0.2	8.2	1.6	0.1	7.3	6.0			100.9	0.3
Delay (s)	26.9	3.9	0.2	62.7	24.3	16.5	58.2	57.0			154.3	48.3
Level of Service	C	A	A	E	C	B	E	E			F	D
Approach Delay (s)		6.8			26.3			57.4			86.9	
Approach LOS		A			C			E			F	

Intersection Summary			
HCM Average Control Delay	20.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
15: Oakley Road & Neroly Road

2010 & Proj PM
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	94	60	10	84	97	50	244	10	157	344	10
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	10	96	61	10	86	99	51	249	10	160	351	10

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	167	195	310	521
Volume Left (vph)	10	10	51	160
Volume Right (vph)	61	99	10	10
Hadj (s)	-0.17	-0.26	0.05	0.08
Departure Headway (s)	6.7	6.6	6.2	5.9
Degree Utilization, x	0.31	0.36	0.53	0.85
Capacity (veh/h)	473	495	538	594
Control Delay (s)	12.8	13.2	16.1	32.9
Approach Delay (s)	12.8	13.2	16.1	32.9
Approach LOS	B	B	C	D

Intersection Summary			
Delay	22.5		
HCM Level of Service	C		
Intersection Capacity Utilization	67.2%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
16: Oakley Road & Live Oak Ave

2010 & Proj PM
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	27	170	30	40	130	99	30	309	30	160	361	28
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	30	189	33	44	144	110	33	343	33	178	401	31

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	252	299	410	610
Volume Left (vph)	30	44	33	178
Volume Right (vph)	33	110	33	31
Hadj (s)	-0.02	-0.16	0.00	0.06
Departure Headway (s)	8.4	8.1	7.7	7.7
Degree Utilization, x	0.59	0.67	0.88	1.30
Capacity (veh/h)	397	416	452	474
Control Delay (s)	22.9	26.2	45.0	174.9
Approach Delay (s)	22.9	26.2	45.0	174.9
Approach LOS	C	D	E	F

Intersection Summary			
Delay	88.3		
HCM Level of Service	F		
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
17: Oakley Road & Empire Avenue

2010 & Proj PM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↑	↱		↰↑	↱	↰	↑↑↱		↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95		1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1727	1583		1812	1583	1770	3525		1770	1863	1583
Flt Permitted	0.95	0.98	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1727	1583		1812	1583	1770	3525		1770	1863	1583
Volume (vph)	110	40	290	50	40	60	229	360	10	140	458	70
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	120	43	315	54	43	65	249	391	11	152	498	76
RTOR Reduction (vph)	0	0	279	0	0	57	0	2	0	0	0	49
Lane Group Flow (vph)	79	84	36	0	97	8	249	400	0	152	498	27
Turn Type	Split		Perm	Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8						6
Actuated Green, G (s)	8.3	8.3	8.3		7.4	7.4	13.2	28.8		8.8	24.4	24.4
Effective Green, g (s)	8.3	8.3	8.3		8.4	8.4	14.2	29.8		9.8	25.4	25.4
Actuated g/C Ratio	0.11	0.11	0.11		0.12	0.12	0.20	0.41		0.14	0.35	0.35
Clearance Time (s)	4.0	4.0	4.0		5.0	5.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	193	198	182		211	184	348	1453		240	654	556
v/s Ratio Prot	0.05	c0.05			c0.05		c0.14	0.11		0.09	c0.27	
v/s Ratio Perm			0.02			0.00						0.02
v/c Ratio	0.41	0.42	0.20		0.46	0.04	0.72	0.28		0.63	0.76	0.05
Uniform Delay, d1	29.7	29.8	29.0		29.8	28.4	27.2	14.1		29.6	20.8	15.5
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.4	1.5	0.5		1.6	0.1	6.8	0.1		5.4	5.2	0.0
Delay (s)	31.1	31.2	29.5		31.4	28.5	34.0	14.2		34.9	26.0	15.5
Level of Service	C	C	C		C	C	C	B		C	C	B
Approach Delay (s)		30.1			30.2			21.8			26.8	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	26.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	72.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: Main Street & Empire Avenue

2010 & Proj PM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑↱		↰↰	↑	↱		↰↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.98	1.00
Satd. Flow (prot)	1719	3539	1538	1770	3532		3335	1810	1583		1791	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.98	1.00
Satd. Flow (perm)	1719	3539	1538	1770	3532		3335	1810	1583		1791	1538
Volume (vph)	50	1219	458	190	753	10	270	30	230	20	20	20
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	53	1297	487	202	801	11	287	32	245	21	21	21
RTOR Reduction (vph)	0	0	266	0	1	0	0	0	177	0	0	20
Lane Group Flow (vph)	53	1297	221	202	811	0	287	32	68	0	42	1
Heavy Vehicles (%)	5%	2%	5%	2%	2%	2%	5%	5%	2%	2%	5%	5%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	3.3	34.7	34.7	10.7	42.1		12.1	12.1	12.1		2.2	2.2
Effective Green, g (s)	4.3	35.7	35.7	11.7	43.1		13.1	13.1	13.1		2.2	2.2
Actuated g/C Ratio	0.05	0.45	0.45	0.15	0.55		0.17	0.17	0.17		0.03	0.03
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	94	1605	698	263	1934		555	301	263		50	43
v/s Ratio Prot	0.03	c0.37		c0.11	0.23		c0.09	0.02			c0.02	
v/s Ratio Perm			0.14						0.04			0.00
v/c Ratio	0.56	0.81	0.32	0.77	0.42		0.52	0.11	0.26		0.84	0.01
Uniform Delay, d1	36.3	18.5	13.7	32.2	10.5		29.9	27.8	28.6		38.1	37.2
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	7.5	3.1	0.3	12.6	0.1		0.8	0.2	0.5		69.8	0.1
Delay (s)	43.8	21.6	14.0	44.8	10.6		30.7	28.0	29.1		107.9	37.3
Level of Service	D	C	B	D	B		C	C	C		F	D
Approach Delay (s)		20.3			17.4			29.9			84.4	
Approach LOS		C			B			C			F	

Intersection Summary			
HCM Average Control Delay	22.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	78.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
19: Main Street & Vintage Parkway

2010 & Proj PM
11/6/2006

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑	↑↑↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3445		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3539	3445		1770	1583
Volume (vph)	195	1204	789	170	180	135
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	207	1281	839	181	191	144
RTOR Reduction (vph)	0	0	21	0	0	120
Lane Group Flow (vph)	207	1281	999	0	191	24
Turn Type	Prot					Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	8.3	39.3	27.0		9.6	9.6
Effective Green, g (s)	8.3	40.3	28.0		9.6	9.6
Actuated g/C Ratio	0.14	0.70	0.48		0.17	0.17
Clearance Time (s)	4.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	254	2463	1666		293	262
v/s Ratio Prot	c0.12	0.36	c0.29		c0.11	
v/s Ratio Perm						0.02
v/c Ratio	0.81	0.52	0.60		0.65	0.09
Uniform Delay, d1	24.1	4.2	10.9		22.6	20.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	17.9	0.2	0.6		5.1	0.2
Delay (s)	41.9	4.4	11.5		27.7	20.6
Level of Service	D	A	B		C	C
Approach Delay (s)		9.6	11.5		24.7	
Approach LOS		A	B		C	

Intersection Summary			
HCM Average Control Delay	12.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	57.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: Main Street & O'Hara Avenue

2010 & Proj PM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑↱			✣	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85			0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1770	1863	1583	1770	1861		1770	1583			1695	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.76	1.00			0.94	
Satd. Flow (perm)	1770	1863	1583	1770	1861		1409	1583			1638	
Volume (vph)	5	1143	271	20	793	5	195	0	50	1	0	1
Peak-hour factor, PHF	0.92	0.94	0.94	0.94	0.94	0.92	0.94	0.92	0.94	0.92	0.92	0.92
Adj. Flow (vph)	5	1216	288	21	844	5	207	0	53	1	0	1
RTOR Reduction (vph)	0	0	78	0	0	0	0	44	0	0	1	0
Lane Group Flow (vph)	5	1216	210	21	849	0	207	9	0	0	1	0
Turn Type	Prot		Perm	Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4				2			6		
Actuated Green, G (s)	0.7	73.3	73.3	1.5	74.1		17.4	17.4			18.4	
Effective Green, g (s)	0.7	74.3	74.3	1.5	75.1		18.4	18.4			18.4	
Actuated g/C Ratio	0.01	0.70	0.70	0.01	0.71		0.17	0.17			0.17	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	12	1303	1108	25	1316		244	274			284	
v/s Ratio Prot	0.00	c0.65		c0.01	0.46			0.01				
v/s Ratio Perm			0.13				c0.15				0.00	
v/c Ratio	0.42	0.93	0.19	0.84	0.64		0.85	0.03			0.00	
Uniform Delay, d1	52.5	13.8	5.5	52.2	8.4		42.5	36.5			36.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	21.8	12.2	0.1	109.3	1.1		23.0	0.1			0.0	
Delay (s)	74.3	26.0	5.6	161.5	9.5		65.5	36.6			36.3	
Level of Service	E	C	A	F	A		E	D			D	
Approach Delay (s)		22.3			13.1			59.6			36.3	
Approach LOS		C			B			E			D	

Intersection Summary			
HCM Average Control Delay	22.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	106.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
21: Cypress Road & Empire Avenue

2010 & Proj PM
11/6/2006

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↱		↰	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.96		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3397		1770	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	3397		1770	3539
Volume (vph)	120	223	437	160	251	557
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	128	237	465	170	267	593
RTOR Reduction (vph)	0	196	54	0	0	0
Lane Group Flow (vph)	128	41	581	0	267	593
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	7.4	7.4	15.9		11.3	31.2
Effective Green, g (s)	8.4	8.4	16.9		11.3	32.2
Actuated g/C Ratio	0.17	0.17	0.35		0.23	0.66
Clearance Time (s)	5.0	5.0	5.0		4.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	306	274	1181		412	2345
v/s Ratio Prot	c0.07		c0.17		c0.15	0.17
v/s Ratio Perm		0.03				
v/c Ratio	0.42	0.15	0.49		0.65	0.25
Uniform Delay, d1	17.9	17.1	12.5		16.9	3.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.9	0.3	0.3		3.5	0.1
Delay (s)	18.8	17.3	12.8		20.3	3.4
Level of Service	B	B	B		C	A
Approach Delay (s)	17.9		12.8			8.6
Approach LOS	B		B			A

Intersection Summary			
HCM Average Control Delay	11.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	48.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
22: Cypress Road & Main Street

2010 & Proj PM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↱	↱	↰	↑↑	↱	↰↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	0.95	1.00	0.95	1.00	0.97	0.95	
Frt	1.00	0.96		1.00	0.98	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3388		1770	1743	1504	1770	3539	1583	3433	3496	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3388		1770	1743	1504	1770	3539	1583	3433	3496	
Volume (vph)	30	152	60	100	210	312	30	462	100	530	573	50
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	33	169	67	111	233	347	33	513	111	589	637	56
RTOR Reduction (vph)	0	53	0	0	5	244	0	0	74	0	6	0
Lane Group Flow (vph)	33	183	0	111	254	77	33	513	37	589	687	0
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			
Actuated Green, G (s)	1.7	14.6		6.0	18.9	18.9	1.7	26.4	26.4	16.3	41.0	
Effective Green, g (s)	1.7	14.6		6.0	18.9	18.9	1.7	26.4	26.4	16.3	41.0	
Actuated g/C Ratio	0.02	0.18		0.08	0.24	0.24	0.02	0.33	0.33	0.21	0.52	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	38	624		134	415	358	38	1178	527	706	1808	
v/s Ratio Prot	0.02	0.05		c0.06	c0.15		0.02	c0.14		c0.17	0.20	
v/s Ratio Perm						0.05			0.02			
v/c Ratio	0.87	0.29		0.83	0.61	0.21	0.87	0.44	0.07	0.83	0.38	
Uniform Delay, d1	38.7	27.9		36.1	26.9	24.2	38.7	20.6	18.1	30.2	11.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	93.8	0.3		32.5	2.7	0.3	93.8	1.2	0.3	8.4	0.6	
Delay (s)	132.5	28.2		68.6	29.6	24.5	132.5	21.8	18.3	38.6	12.1	
Level of Service	F	C		E	C	C	F	C	B	D	B	
Approach Delay (s)		41.0			33.5			26.8			24.3	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	28.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	79.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
23: Neroly Road & Live Oak Ave

2010 & Proj PM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↱			↰↑↱			↰↑↱	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	20	217	164	80	187	239	84	94	40	251	175	50
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	236	178	87	203	260	91	102	43	273	190	54

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	140	296	189	361	237	517
Volume Left (vph)	22	0	87	0	91	273
Volume Right (vph)	0	178	0	260	43	54
Hadj (s)	0.11	-0.39	0.26	-0.47	0.00	0.08
Departure Headway (s)	8.7	8.2	8.6	7.9	8.5	7.9
Degree Utilization, x	0.34	0.67	0.45	0.79	0.56	1.13
Capacity (veh/h)	406	427	410	448	402	450
Control Delay (s)	14.8	25.1	17.3	33.7	22.0	110.1
Approach Delay (s)	21.8		28.1		22.0	110.1
Approach LOS	C		D		C	F

Intersection Summary			
Delay	50.1		
HCM Level of Service	F		
Intersection Capacity Utilization	75.9%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
24: Laurel Road & Live Oak Avenue

2010 & Proj PM
11/6/2006

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰↰	↑↑↑	↑↑↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	0.91	0.91		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3433	5085	5023		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	3433	5085	5023		1770	1583
Volume (vph)	420	900	980	87	127	382
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	457	978	1065	95	138	415
RTOR Reduction (vph)	0	0	17	0	0	331
Lane Group Flow (vph)	457	978	1143	0	138	84
Turn Type	Prot					Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	10.6	30.8	16.2		9.8	9.8
Effective Green, g (s)	10.6	30.8	16.2		9.8	9.8
Actuated g/C Ratio	0.22	0.63	0.33		0.20	0.20
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	749	3223	1674		357	319
v/s Ratio Prot	c0.13	0.19	c0.23		c0.08	
v/s Ratio Perm						0.05
v/c Ratio	0.61	0.30	0.68		0.39	0.26
Uniform Delay, d1	17.1	4.0	14.0		16.8	16.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.5	0.1	1.2		0.7	0.4
Delay (s)	18.6	4.1	15.2		17.5	16.8
Level of Service	B	A	B		B	B
Approach Delay (s)		8.7	15.2		17.0	
Approach LOS		A	B		B	

Intersection Summary			
HCM Average Control Delay	12.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	48.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

25: Laurel Road & Empire Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.98		1.00	0.98		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3485		1770	3476		1770	3459		1770	3329	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3485		1770	3476		1770	3459		1770	3329	
Volume (vph)	200	797	90	80	677	92	150	505	90	192	366	240
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	213	848	96	85	720	98	160	537	96	204	389	255
RTOR Reduction (vph)	0	11	0	0	14	0	0	20	0	0	150	0
Lane Group Flow (vph)	213	933	0	85	804	0	160	613	0	204	494	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	10.6	25.3		4.6	19.3		8.7	16.2		10.5	18.0	
Effective Green, g (s)	10.6	25.3		4.6	19.3		8.7	16.2		10.5	18.0	
Actuated g/C Ratio	0.15	0.35		0.06	0.27		0.12	0.22		0.14	0.25	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	258	1214		112	924		212	772		256	825	
v/s Ratio Prot	c0.12	0.27		0.05	c0.23		0.09	c0.18		c0.12	0.15	
v/s Ratio Perm												
v/c Ratio	0.83	0.77		0.76	0.87		0.75	0.79		0.80	0.60	
Uniform Delay, d1	30.1	21.0		33.5	25.5		30.9	26.6		30.0	24.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	18.9	3.0		25.1	9.0		14.1	5.6		15.7	1.2	
Delay (s)	49.0	24.0		58.5	34.4		45.0	32.3		45.7	25.3	
Level of Service	D	C		E	C		D	C		D	C	
Approach Delay (s)		28.6			36.7			34.8			30.2	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM Average Control Delay	32.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	72.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

26: Proj Dwy & Bridgehead Road

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑	↱	↰	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	1863	1583	1770	1863
Volume (vph)	163	99	361	158	98	440
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	177	108	392	172	107	478
RTOR Reduction (vph)	0	88	0	88	0	0
Lane Group Flow (vph)	177	20	392	84	107	478
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	9.5	9.5	24.5	24.5	5.0	33.5
Effective Green, g (s)	9.5	9.5	25.5	25.5	5.0	34.5
Actuated g/C Ratio	0.18	0.18	0.49	0.49	0.10	0.66
Clearance Time (s)	4.0	4.0	5.0	5.0	4.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	323	289	914	776	170	1236
v/s Ratio Prot	c0.10		c0.21		c0.06	0.26
v/s Ratio Perm		0.01		0.05		
v/c Ratio	0.55	0.07	0.43	0.11	0.63	0.39
Uniform Delay, d1	19.3	17.6	8.6	7.1	22.6	4.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	0.1	0.3	0.1	7.1	0.2
Delay (s)	21.2	17.7	8.9	7.2	29.7	4.2
Level of Service	C	B	A	A	C	A
Approach Delay (s)	19.9		8.4			8.8
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	10.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	52.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	43.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

27: Main Street & Proj Dwy Center

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑	↑↑	↱	↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3539	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	3539	3539	1583	1770	1583
Volume (vph)	126	1920	988	152	189	93
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	137	2087	1074	165	205	101
RTOR Reduction (vph)	0	0	0	62	0	85
Lane Group Flow (vph)	137	2087	1074	103	205	16
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	13.9	92.6	74.2	74.2	18.4	18.4
Effective Green, g (s)	14.4	93.1	74.7	74.7	18.9	18.9
Actuated g/C Ratio	0.12	0.78	0.62	0.62	0.16	0.16
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	212	2746	2203	985	279	249
v/s Ratio Prot	0.08	c0.59	0.30		c0.12	
v/s Ratio Perm				0.06		0.01
v/c Ratio	0.65	0.76	0.49	0.10	0.73	0.06
Uniform Delay, d1	50.4	7.3	12.3	9.1	48.2	43.0
Progression Factor	1.14	0.43	0.47	0.34	1.00	1.00
Incremental Delay, d2	4.5	1.4	0.6	0.2	9.6	0.1
Delay (s)	61.7	4.5	6.4	3.3	57.8	43.1
Level of Service	E	A	A	A	E	D
Approach Delay (s)		8.1	6.0		52.9	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	11.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

28: Main Street & Proj Dwy East

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑	↑↑	↱	↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3539	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	3539	3539	1583	1770	1583
Volume (vph)	99	1974	1047	90	97	94
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	108	2146	1138	98	105	102
RTOR Reduction (vph)	0	0	0	30	0	92
Lane Group Flow (vph)	108	2146	1138	68	105	10
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		7	
Permitted Phases				6		7
Actuated Green, G (s)	12.2	99.8	83.6	83.6	12.2	12.2
Effective Green, g (s)	12.2	99.8	83.6	83.6	12.2	12.2
Actuated g/C Ratio	0.10	0.83	0.70	0.70	0.10	0.10
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	180	2943	2466	1103	180	161
v/s Ratio Prot	0.06	c0.61	0.32		c0.06	
v/s Ratio Perm				0.04		0.01
v/c Ratio	0.60	0.73	0.46	0.06	0.58	0.06
Uniform Delay, d1	51.6	4.3	8.1	5.8	51.5	48.7
Progression Factor	1.17	0.43	0.26	0.03	1.00	1.00
Incremental Delay, d2	3.5	1.1	0.5	0.1	4.8	0.2
Delay (s)	64.0	2.9	2.6	0.2	56.2	48.9
Level of Service	E	A	A	A	E	D
Approach Delay (s)		5.9	2.4		52.6	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	7.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis 2010 & Proj PM
29: Proj Dwy & Live Oak Ave 11/6/2006

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↱	↰	↑	↰↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1583	1770	1863	3433	1583
Flt Permitted	1.00	1.00	0.74	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	1384	1863	3433	1583
Volume (vph)	20	506	150	20	521	149
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	550	163	22	566	162
RTOR Reduction (vph)	0	367	0	0	0	100
Lane Group Flow (vph)	22	183	163	22	566	62
Turn Type		Perm	Perm			custom
Protected Phases	4			8		
Permitted Phases		4	8		2	2
Actuated Green, G (s)	9.4	9.4	9.4	9.4	10.9	10.9
Effective Green, g (s)	9.4	9.4	9.4	9.4	10.9	10.9
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.39	0.39
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	619	526	460	619	1322	610
v/s Ratio Prot	0.01			0.01		
v/s Ratio Perm		0.12	c0.12		c0.16	0.04
v/c Ratio	0.04	0.35	0.35	0.04	0.43	0.10
Uniform Delay, d1	6.4	7.1	7.2	6.4	6.4	5.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	0.4	0.5	0.0	0.2	0.1
Delay (s)	6.4	7.5	7.6	6.4	6.6	5.6
Level of Service	A	A	A	A	A	A
Approach Delay (s)	7.5			7.5	6.4	
Approach LOS	A			A	A	

Intersection Summary			
HCM Average Control Delay	7.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	28.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION     1 Minaker/Wilbur                    Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            20   10   10
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    10 ---  1.0   1.0  1.1  1.1   1.1 ---   10  RIGHT
                                                          STREET NAME:
THRU   421 ---> 2.1  (NO. OF LANES)   2.1<---  221  THRU  Wilbur

RIGHT  160 ---  1.1   1.1  1.1  1.0   1.0 ---   30  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  60    0   40                         Urb=N, Rur=N
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Minaker
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      40         10 *     1650     0.0061
    THRU (T)        0          0       1650     0.0000
    LEFT (L)       60         60       1650     0.0364     0.0364
    T + L                     60       1650     0.0364
------------------------------------------------------------------------
SB  RIGHT (R)      20         10 *     1650     0.0061
    THRU (T)       10         10       1650     0.0061
    LEFT (L)       10         10       1650     0.0061
    T + L                     20       1650     0.0121     0.0121
------------------------------------------------------------------------
EB  RIGHT (R)     160        160       1650     0.0970
    THRU (T)      421        421       3300     0.1276
    LEFT (L)       10         10       1650     0.0061
    T + R                    581       3300     0.1761     0.1761
------------------------------------------------------------------------
WB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      221        221       3300     0.0670
    LEFT (L)       30         30       1650     0.0182     0.0182
    T + R                    231       3300     0.0700
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.24
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION     6 Hillcrest/18th St                 Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------            30  120   60
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    40 ---  1.0   1.0  1.0  1.0   1.1 ---   40  RIGHT
                                                          STREET NAME:
THRU   451 ---> 2.1  (NO. OF LANES)   2.1<---  431  THRU  18th St

RIGHT  230 ---  1.1   1.0  1.0  1.0   1.0 ---  371  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 170  150  311                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Hillcrest
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     311          0 *     1650     0.0000
    THRU (T)      150        150       1650     0.0909
    LEFT (L)      170        170       1650     0.1030     0.1030
------------------------------------------------------------------------
SB  RIGHT (R)      30          0 *     1650     0.0000
    THRU (T)      120        120       1650     0.0727     0.0727
    LEFT (L)       60         60       1650     0.0364
------------------------------------------------------------------------
EB  RIGHT (R)     230        230       1650     0.1394
    THRU (T)      451        451       3300     0.1367
    LEFT (L)       40         40       1650     0.0242
    T + R                    681       3300     0.2064     0.2064
------------------------------------------------------------------------
WB  RIGHT (R)      40         40       1650     0.0242
    THRU (T)      431        431       3300     0.1306
    LEFT (L)      371        371       1650     0.2248     0.2248
    T + R                    471       3300     0.1427
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.61
     INTERSECTION LEVEL OF SERVICE:                             B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION     7 Viera/18th St                     Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       2-PHASE SIGNAL
-----------            70   60   76
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    60 ---  1.0   1.1  1.1  1.1   1.1 ---   36  RIGHT
                                                          STREET NAME:
THRU   673 ---> 2.0  (NO. OF LANES)   1.1<---  614  THRU  18th St

RIGHT  110 ---  1.0   1.1  1.1  1.0   1.0 ---   10  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  90   10   20                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Viera
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      20         10 *     1800     0.0056
    THRU (T)       10         10       1800     0.0056
    LEFT (L)       90         90       1800     0.0500     0.0500
    T + L                    100       1800     0.0556
------------------------------------------------------------------------
SB  RIGHT (R)      70         70       1800     0.0389
    THRU (T)       60         60       1800     0.0333
    LEFT (L)       76         76       1800     0.0422
    T + R                    130       1800     0.0722
    T + L                    136       1800     0.0756
    T + R + L                206       1800     0.1144     0.1144
------------------------------------------------------------------------
EB  RIGHT (R)     110         20 *     1800     0.0111
    THRU (T)      673        673       3600     0.1869
    LEFT (L)       60         60       1800     0.0333     0.0333
------------------------------------------------------------------------
WB  RIGHT (R)      36         36       1800     0.0200
    THRU (T)      614        614       1800     0.3411
    LEFT (L)       10         10       1800     0.0056
    T + R                    650       1800     0.3611     0.3611
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.56
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION     8 Phillips Lane/18th Street         Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------           160   10  130
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   140 ---  1.0   1.1  1.1  2.0   1.0 ---  120  RIGHT
                                                          STREET NAME:
THRU   639 ---> 2.1  (NO. OF LANES)   2.0<---  510  THRU  18th Street

RIGHT   10 ---  1.1   1.0  1.1  1.1   1.0 ---   10  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  10   10   20                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Phillips Lane
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)       10         10       1650     0.0061
    LEFT (L)       10         10       1650     0.0061
    T + R                     30       1650     0.0182     0.0182
------------------------------------------------------------------------
SB  RIGHT (R)     160        160       1650     0.0970
    THRU (T)       10         10       1650     0.0061
    LEFT (L)      130        130       3000     0.0433
    T + R                    170       1650     0.1030     0.1030
------------------------------------------------------------------------
EB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      639        639       3300     0.1936
    LEFT (L)      140        140       1650     0.0848     0.0848
    T + R                    649       3300     0.1967
------------------------------------------------------------------------
WB  RIGHT (R)     120         49 *     1650     0.0297
    THRU (T)      510        510       3300     0.1545     0.1545
    LEFT (L)       10         10       1650     0.0061
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.36
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION     9 SR 160 SB Ramp/Main Street        Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            20   30   80
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    30 ---  1.0   1.1  1.1  1.0   1.0 ---  100  RIGHT
                                                          STREET NAME:
THRU   729 ---> 2.1  (NO. OF LANES)   2.0<---  560  THRU  Main Street

RIGHT   60 ---  1.1   1.0  1.1  1.1   2.0 ---  592  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  40   20  141                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 SB Ramp
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     141        141       1650     0.0855
    THRU (T)       20         20       1650     0.0121
    LEFT (L)       40         40       1650     0.0242
    T + R                    161       1650     0.0976     0.0976
------------------------------------------------------------------------
SB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)       30         30       1650     0.0182
    LEFT (L)       80         80       1650     0.0485     0.0485
    T + R                     50       1650     0.0303
------------------------------------------------------------------------
EB  RIGHT (R)      60         60       1650     0.0364
    THRU (T)      729        729       3300     0.2209
    LEFT (L)       30         30       1650     0.0182
    T + R                    789       3300     0.2391     0.2391
------------------------------------------------------------------------
WB  RIGHT (R)     100         20 *     1650     0.0121
    THRU (T)      560        560       3300     0.1697
    LEFT (L)      592        592       3000     0.1973     0.1973
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.58
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION    10 SR 160 NB Ramp/Main Street        Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0    0    0
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  RIGHT
                                                          STREET NAME:
THRU   900 ---> 2.1  (NO. OF LANES)   2.0<--- 1162  THRU  Main Street

RIGHT   50 ---  1.1   1.0  0.0  2.5   1.0 ---   81  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  90    0 1350                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 NB Ramp
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)    1350       1203 *     3127     0.3847     0.3847
    LEFT (L)       90         90       1720     0.0523
------------------------------------------------------------------------
EB  RIGHT (R)      50         50       1720     0.0291
    THRU (T)      900        900       3440     0.2616
    T + R                    950       3440     0.2762
------------------------------------------------------------------------
WB  THRU (T)     1162       1162       3440     0.3378     0.3378
    LEFT (L)       81         81       1720     0.0471
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.72
     INTERSECTION LEVEL OF SERVICE:                             C
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION    11 Neroly/Main Street                Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------           172  151  280
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   188 ---  1.0   1.0  1.1  2.1   1.0 ---  181  RIGHT
                                                          STREET NAME:
THRU  1671 ---> 2.1  (NO. OF LANES)   3.0<---  851  THRU  Main Street

RIGHT  390 ---  1.1   2.0  1.1  1.1   1.0 ---   30  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 220  160   60                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Neroly
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      60         60       1650     0.0364
    THRU (T)      160        160       1650     0.0970
    LEFT (L)      220        220       3000     0.0733
    T + R                    220       1650     0.1333     0.1333
------------------------------------------------------------------------
SB  RIGHT (R)     172          0 *     1650     0.0000
    THRU (T)      151        151       1650     0.0915
    LEFT (L)      280        280       3000     0.0933
    T + L                    431       3000     0.1437     0.1437
------------------------------------------------------------------------
EB  RIGHT (R)     390        390       1650     0.2364
    THRU (T)     1671       1671       3300     0.5064
    LEFT (L)      188        188       1650     0.1139
    T + R                   2061       3300     0.6245     0.6245
------------------------------------------------------------------------
WB  RIGHT (R)     181         27 *     1650     0.0164
    THRU (T)      851        851       4950     0.1719
    LEFT (L)       30         30       1650     0.0182     0.0182
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.92
     INTERSECTION LEVEL OF SERVICE:                             E
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION    12 Sandy Lane/Main Street            Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------           125    7  194
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   160 ---  1.0   1.1  1.1  1.0   1.0 ---  144  RIGHT
                                                          STREET NAME:
THRU  1842 ---> 2.1  (NO. OF LANES)   2.0<---  927  THRU  Main Street

RIGHT   10 ---  1.1   1.0  1.1  1.1   1.0 ---   10  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  10    7   10                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Sandy Lane
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)        7          7       1650     0.0042
    LEFT (L)       10         10       1650     0.0061
    T + R                     17       1650     0.0103     0.0103
------------------------------------------------------------------------
SB  RIGHT (R)     125        125       1650     0.0758
    THRU (T)        7          7       1650     0.0042
    LEFT (L)      194        194       1650     0.1176     0.1176
    T + R                    132       1650     0.0800
------------------------------------------------------------------------
EB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)     1842       1842       3300     0.5582
    LEFT (L)      160        160       1650     0.0970
    T + R                   1852       3300     0.5612     0.5612
------------------------------------------------------------------------
WB  RIGHT (R)     144          0 *     1650     0.0000
    THRU (T)      927        927       3300     0.2809
    LEFT (L)       10         10       1650     0.0061     0.0061
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.70
     INTERSECTION LEVEL OF SERVICE:                             B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
=========================================================================
Condition: 2010 Plus Project                                     11/03/06
=========================================================================
INTERSECTION    13 Live Oak/Main Street             Oakley
Count Date                  Time                Peak Hour PM
-------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                        8-PHASE SIGNAL
-----------           117  341  198
                        |    |    |
             ^          |    |    |          ^
             |       <---    v    --->       | Split? N
LEFT   147 ---  1.0   1.1  2.1  2.0   1.0 ---  179  RIGHT
                                                            STREET NAME:
THRU  1861 ---> 2.1  (NO. OF LANES)   2.0<---  945  THRU  Main Street

RIGHT  101 ---  1.1   1.0  2.1  1.1   1.0 ---   37  LEFT
             |       <---    ^    --->       |
             v          |    |    |          v
  N                     |    |    |                      SIG WARRANTS:
W + E                 78  343   54                         Urb=Y, Rur=Y
  S                 LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
=========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
-------------------------------------------------------------------------
NB  RIGHT (R)      54         54       1650     0.0327
    THRU (T)      343        343       3300     0.1039
    LEFT (L)       78         78       1650     0.0473
    T + R                    397       3300     0.1203      0.1203
-------------------------------------------------------------------------
SB  RIGHT (R)     117        117       1650     0.0709
    THRU (T)      341        341       3300     0.1033
    LEFT (L)      198        198       3000     0.0660      0.0660
    T + R                    458       3300     0.1388
-------------------------------------------------------------------------
EB  RIGHT (R)     101        101       1650     0.0612
    THRU (T)     1861       1861       3300     0.5639
    LEFT (L)      147        147       1650     0.0891
    T + R                   1962       3300     0.5945      0.5945
-------------------------------------------------------------------------
WB  RIGHT (R)     179         70 *     1650     0.0424
    THRU (T)      945        945       3300     0.2864
    LEFT (L)       37         37       1650     0.0224      0.0224
=========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                        0.80
     INTERSECTION LEVEL OF SERVICE:                            C
=========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
=========================================================================
Condition: 2010 Plus Project                                     11/03/06
=========================================================================
INTERSECTION    14 Big Break/Main Street            Oakley
Count Date                  Time                Peak Hour PM
-------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                        5-PHASE SIGNAL
-----------           141   40   40
                        |    |    |
             ^          |    |    |          ^
             |       <---    v    --->       | Split? N
LEFT   297 ---  1.0   1.0  1.1  1.1   1.0 ---   60  RIGHT
                                                            STREET NAME:
THRU  1644 ---> 2.0  (NO. OF LANES)   2.0<---  946  THRU  Main Street

RIGHT  170 ---  1.0   1.0  1.1  1.1   1.0 ---   70  LEFT
             |       <---    ^    --->       |
             v          |    |    |          v
  N                     |    |    |                      SIG WARRANTS:
W + E                 70   60   90                         Urb=Y, Rur=Y
  S                 LEFT THRU RIGHT Split? N

               STREET NAME: Big Break
=========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
-------------------------------------------------------------------------
NB  RIGHT (R)      90         90       1650     0.0545
    THRU (T)       60         60       1650     0.0364
    LEFT (L)       70         70       1650     0.0424
    T + R                    150       1650     0.0909      0.0909
-------------------------------------------------------------------------
SB  RIGHT (R)     141          0 *     1650     0.0000
    THRU (T)       40         40       1650     0.0242
    LEFT (L)       40         40       1650     0.0242      0.0242
    T + L                     80       1650     0.0485
-------------------------------------------------------------------------
EB  RIGHT (R)     170        100 *     1650     0.0606
    THRU (T)     1644       1644       3300     0.4982      0.4982
    LEFT (L)      297        297       1650     0.1800
-------------------------------------------------------------------------
WB  RIGHT (R)      60         20 *     1650     0.0121
    THRU (T)      946        946       3300     0.2867
    LEFT (L)       70         70       1650     0.0424      0.0424
=========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                        0.66
     INTERSECTION LEVEL OF SERVICE:                            B
=========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
=========================================================================
Condition: 2010 Plus Project                                     11/03/06
=========================================================================
INTERSECTION    17 Empire Ave/Oakley Road           Oakley
Count Date                  Time                Peak Hour PM
-------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                        6-PHASE SIGNAL
-----------            70  458  140
                        |    |    |
             ^          |    |    |          ^
             |       <---    v    --->       | Split? Y
LEFT   110 ---  2.1   1.0  1.0  1.0   1.0 ---   60  RIGHT
                                                            STREET NAME:
THRU    40 ---> 1.1  (NO. OF LANES)   1.1<---   40  THRU  Oakley Road

RIGHT  290 ---  1.0   1.0  2.1  1.1   1.1 ---   50  LEFT
             |       <---    ^    --->       |
             v          |    |    |          v
  N                     |    |    |                      SIG WARRANTS:
W + E                229  360   10                         Urb=Y, Rur=Y
  S                 LEFT THRU RIGHT Split? N

               STREET NAME: Empire Ave
=========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
-------------------------------------------------------------------------
NB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      360        360       3300     0.1091
    LEFT (L)      229        229       1650     0.1388      0.1388
    T + R                    370       3300     0.1121
-------------------------------------------------------------------------
SB  RIGHT (R)      70         10 *     1650     0.0061
    THRU (T)      458        458       1650     0.2776      0.2776
    LEFT (L)      140        140       1650     0.0848
-------------------------------------------------------------------------
EB  RIGHT (R)     290         61 *     1650     0.0370
    THRU (T)       40         40       1650     0.0242
    LEFT (L)      110        110       3000     0.0367
    T + L                    150       3000     0.0500      0.0500
-------------------------------------------------------------------------
WB  RIGHT (R)      60          0 *     1650     0.0000
    THRU (T)       40         40       1650     0.0242
    LEFT (L)       50         50       1650     0.0303
    T + L                     90       1650     0.0545      0.0545
=========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                        0.52
     INTERSECTION LEVEL OF SERVICE:                            A
=========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
=========================================================================
Condition: 2010 Plus Project                                     11/03/06
=========================================================================
INTERSECTION    18 Empire Avenue/Main Street        Oakley
Count Date                  Time                Peak Hour PM
-------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                        6-PHASE SIGNAL
-----------            20   20   20
                        |    |    |
             ^          |    |    |          ^
             |       <---    v    --->       | Split? N
LEFT    50 ---  1.0   1.0  1.1  1.1   1.1 ---   10  RIGHT
                                                            STREET NAME:
THRU  1219 ---> 2.0  (NO. OF LANES)   2.1<---  753  THRU  Main Street

RIGHT  458 ---  1.0   2.0  1.0  1.0   1.0 ---  190  LEFT
             |       <---    ^    --->       |
             v          |    |    |          v
  N                     |    |    |                      SIG WARRANTS:
W + E                270   30  230                         Urb=Y, Rur=Y
  S                 LEFT THRU RIGHT Split? Y

               STREET NAME: Empire Avenue
=========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
-------------------------------------------------------------------------
NB  RIGHT (R)     230         40 *     1650     0.0242
    THRU (T)       30         30       1650     0.0182
    LEFT (L)      270        270       3000     0.0900      0.0900
-------------------------------------------------------------------------
SB  RIGHT (R)      20          0 *     1650     0.0000
    THRU (T)       20         20       1650     0.0121
    LEFT (L)       20         20       1650     0.0121
    T + L                     40       1650     0.0242      0.0242
-------------------------------------------------------------------------
EB  RIGHT (R)     458        310 *     1650     0.1879
    THRU (T)     1219       1219       3300     0.3694      0.3694
    LEFT (L)       50         50       1650     0.0303
-------------------------------------------------------------------------
WB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      753        753       3300     0.2282
    LEFT (L)      190        190       1650     0.1152      0.1152
    T + R                    763       3300     0.2312
=========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                        0.60
     INTERSECTION LEVEL OF SERVICE:                            A
=========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION    19 Vintage/Main Street               Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------           135    0  180
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   195 ---  1.0   1.0  0.0  1.0   1.1 ---  170  RIGHT
                                                          STREET NAME:
THRU  1204 ---> 2.0  (NO. OF LANES)   2.1<---  789  THRU  Main Street

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Vintage
========================================================================
               ORIGINAL  ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)     135          0 *     1720     0.0000
    LEFT (L)      180        180       1720     0.1047     0.1047
------------------------------------------------------------------------
EB  THRU (T)     1204       1204       3440     0.3500
    LEFT (L)      195        195       1720     0.1134     0.1134
------------------------------------------------------------------------
WB  RIGHT (R)     170        170       1720     0.0988
    THRU (T)      789        789       3440     0.2294
    T + R                    959       3440     0.2788     0.2788
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.50
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION    20 O'Hara Avenue/Main Street         Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------             1    0    1
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     5 ---  1.0   1.1  1.1  1.1   1.1 ---    5  RIGHT
                                                          STREET NAME:
THRU  1143 ---> 1.0  (NO. OF LANES)   1.1<---  793  THRU  Main Street

RIGHT  271 ---  1.0   1.0  1.1  1.1   1.0 ---   20  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 195    0   50                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: O'Hara Avenue
========================================================================
               ORIGINAL  ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)        0          0       1650     0.0000
    LEFT (L)      195        195       1650     0.1182     0.1182
    T + R                     50       1650     0.0303
------------------------------------------------------------------------
SB  RIGHT (R)       1          1       1650     0.0006
    THRU (T)        0          0       1650     0.0000
    LEFT (L)        1          1       1650     0.0006
    T + R                      1       1650     0.0006
    T + L                      1       1650     0.0006
    T + R + L                  2       1650     0.0012     0.0012
------------------------------------------------------------------------
EB  RIGHT (R)     271         76 *     1650     0.0461
    THRU (T)     1143       1143       1650     0.6927     0.6927
    LEFT (L)        5          5       1650     0.0030
------------------------------------------------------------------------
WB  RIGHT (R)       5          5       1650     0.0030
    THRU (T)      793        793       1650     0.4806
    LEFT (L)       20         20       1650     0.0121     0.0121
    T + R                    798       1650     0.4836
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.82
     INTERSECTION LEVEL OF SERVICE:                             D
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION    21 Empire Avenue/Cypress Road        Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0  557  251
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  2.0  1.0   1.0 ---  223  RIGHT
                                                          STREET NAME:
THRU     0 ---> 0.0  (NO. OF LANES)   0.0<---    0  THRU  Cypress Road

RIGHT    0 ---  0.0   0.0  2.1  1.1   1.0 ---  120  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0  437  160                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire Avenue
========================================================================
               ORIGINAL  ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     160        160       1720     0.0930
    THRU (T)      437        437       3440     0.1270
    T + R                    597       3440     0.1735     0.1735
------------------------------------------------------------------------
SB  THRU (T)      557        557       3440     0.1619
    LEFT (L)      251        251       1720     0.1459     0.1459
------------------------------------------------------------------------
WB  RIGHT (R)     223          0 *     1720     0.0000
    LEFT (L)      120        120       1720     0.0698     0.0698
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.39
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION    22 Main Street/Cypress               Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            50  573  530
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    30 ---  1.0   1.1  2.1  2.0   2.1 ---  312  RIGHT
                                                          STREET NAME:
THRU   152 ---> 2.1  (NO. OF LANES)   1.1<---  210  THRU  Cypress

RIGHT   60 ---  1.1   1.0  2.0  1.0   1.0 ---  100  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  30  462  100                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Main Street
========================================================================
               ORIGINAL  ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     100          0 *     1650     0.0000
    THRU (T)      462        462       3300     0.1400     0.1400
    LEFT (L)       30         30       1650     0.0182
------------------------------------------------------------------------
SB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)      573        573       3300     0.1736
    LEFT (L)      530        530       3000     0.1767     0.1767
    T + R                    623       3300     0.1888
------------------------------------------------------------------------
EB  RIGHT (R)      60         60       1650     0.0364
    THRU (T)      152        152       3300     0.0461
    LEFT (L)       30         30       1650     0.0182     0.0182
    T + R                    212       3300     0.0642
------------------------------------------------------------------------
WB  RIGHT (R)     312         21 *     3000     0.0070
    THRU (T)      210        210       1650     0.1273     0.1273
    LEFT (L)      100        100       1650     0.0606
    T + R                    231       3000     0.0770
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.46
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION    24 Live Oak/Laurel                   Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------           382    0  127
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   420 ---  2.0   1.0  0.0  1.0   1.1 ---   87  RIGHT
                                                          STREET NAME:
THRU   900 ---> 3.0  (NO. OF LANES)   3.1<---  980  THRU  Laurel

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)     382        151 *     1720     0.0878     0.0878
    LEFT (L)      127        127       1720     0.0738
------------------------------------------------------------------------
EB  THRU (T)      900        900       5160     0.1744
    LEFT (L)      420        420       3127     0.1343     0.1343
------------------------------------------------------------------------
WB  RIGHT (R)      87         87       1720     0.0506
    THRU (T)      980        980       5160     0.1899
    T + R                   1067       5160     0.2068     0.2068
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.43
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION    25 Empire/Laurel                     Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------           240  366  192
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   200 ---  1.0   1.1  2.1  1.0   1.1 ---   92  RIGHT
                                                          STREET NAME:
THRU   797 ---> 2.1  (NO. OF LANES)   2.1<---  677  THRU  Laurel

RIGHT   90 ---  1.1   1.0  2.1  1.1   1.0 ---   80  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 150  505   90                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      90         90       1650     0.0545
    THRU (T)      505        505       3300     0.1530
    LEFT (L)      150        150       1650     0.0909
    T + R                    595       3300     0.1803     0.1803
------------------------------------------------------------------------
SB  RIGHT (R)     240        240       1650     0.1455
    THRU (T)      366        366       3300     0.1109
    LEFT (L)      192        192       1650     0.1164     0.1164
    T + R                    606       3300     0.1836
------------------------------------------------------------------------
EB  RIGHT (R)      90         90       1650     0.0545
    THRU (T)      797        797       3300     0.2415
    LEFT (L)      200        200       1650     0.1212     0.1212
    T + R                    887       3300     0.2688
------------------------------------------------------------------------
WB  RIGHT (R)      92         92       1650     0.0558
    THRU (T)      677        677       3300     0.2052
    LEFT (L)       80         80       1650     0.0485
    T + R                    769       3300     0.2330     0.2330
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.65
     INTERSECTION LEVEL OF SERVICE:                             B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION    26 Bridgehead/Proj Dwy               Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0  440   98
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  1.0  1.0   1.0 ---   99  RIGHT
                                                          STREET NAME:
THRU     0 ---> 0.0  (NO. OF LANES)   0.0<---    0  THRU  Proj Dwy

RIGHT    0 ---  0.0   0.0  1.0  1.0   1.0 ---  163  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0  361  158                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Bridgehead
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     158          0 *     1720     0.0000
    THRU (T)      361        361       1720     0.2099     0.2099
------------------------------------------------------------------------
SB  THRU (T)      440        440       1720     0.2558
    LEFT (L)       98         98       1720     0.0570     0.0570
------------------------------------------------------------------------
WB  RIGHT (R)      99          1 *     1720     0.0006
    LEFT (L)      163        163       1720     0.0948     0.0948
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.36
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION    27 Proj Dwy Center/Main Street       Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------            93    0  189
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   126 ---  1.0   1.0  0.0  1.0   1.0 ---  152  RIGHT
                                                          STREET NAME:
THRU  1920 ---> 2.0  (NO. OF LANES)   2.0<---  988  THRU  Main Street

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Proj Dwy Center
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)      93          0 *     1720     0.0000
    LEFT (L)      189        189       1720     0.1099     0.1099
------------------------------------------------------------------------
EB  THRU (T)     1920       1920       3440     0.5581     0.5581
    LEFT (L)      126        126       1720     0.0733
------------------------------------------------------------------------
WB  RIGHT (R)     152          0 *     1720     0.0000
    THRU (T)      988        988       3440     0.2872
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.67
     INTERSECTION LEVEL OF SERVICE:                             B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION    28 Proj Dwy East/Main Street         Oakley
Count Date                    Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------            94    0   97
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    99 ---  1.0   1.0  0.0  1.0   1.0 ---   90  RIGHT
                                                          STREET NAME:
THRU  1974 ---> 2.0  (NO. OF LANES)   2.0<--- 1047  THRU  Main Street

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Proj Dwy East
========================================================================
               ORIGINAL   ADJUSTED                 V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)      94          0 *     1720     0.0000
    LEFT (L)       97         97       1720     0.0564     0.0564
------------------------------------------------------------------------
EB  THRU (T)     1974       1974       3440     0.5738     0.5738
    LEFT (L)       99         99       1720     0.0576
------------------------------------------------------------------------
WB  RIGHT (R)      90          0 *     1720     0.0000
    THRU (T)     1047       1047       3440     0.3044
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.63
     INTERSECTION LEVEL OF SERVICE:                             B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Plus Project                                    11/03/06
========================================================================
INTERSECTION    29 Live Oak/Proj Dwy                 Oakley
Count Date                    Time                Peak Hour
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       2-PHASE SIGNAL
-----------             0    0    0
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  RIGHT
                                                          STREET NAME:
THRU    20 ---> 1.0  (NO. OF LANES)   1.0<---   20  THRU  Proj Dwy

RIGHT  506 ---  1.0   2.0  0.0  1.0   1.0 ---  150  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 521    0  149                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
========================================================================
               ORIGINAL   ADJUSTED                 V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     149          0 *     1800     0.0000
    LEFT (L)      521        521       3273     0.1592     0.1592
------------------------------------------------------------------------
EB  RIGHT (R)     506        219 *     1800     0.1217     0.1217
    THRU (T)       20         20       1800     0.0111
------------------------------------------------------------------------
WB  THRU (T)       20         20       1800     0.0111
    LEFT (L)      150        150       1800     0.0833     0.0833
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.36
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.PM,CAP=
```

Near Term (2010) With Project AM Mitigation

11: Main Street & Bridgehead Road

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑↑	↱	↰↰	↱		↰↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.91	1.00	0.97	1.00		0.97	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	3331		1719	4940	1538	3335	1738		3335	1810	1538
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1719	3331		1719	4940	1538	3335	1738		3335	1810	1538
Volume (vph)	110	725	190	10	1120	340	200	139	50	113	74	123
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	120	788	207	11	1217	370	217	151	54	123	80	134
RTOR Reduction (vph)	0	16	0	0	0	196	0	16	0	0	0	112
Lane Group Flow (vph)	120	979	0	11	1217	174	217	189	0	123	80	22
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot		Perm	Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6						4
Actuated Green, G (s)	10.6	55.5		1.2	46.1	46.1	10.2	14.3		12.0	16.1	16.1
Effective Green, g (s)	10.6	56.5		1.2	47.1	47.1	10.2	14.3		12.0	16.1	16.1
Actuated g/C Ratio	0.11	0.56		0.01	0.47	0.47	0.10	0.14		0.12	0.16	0.16
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	182	1882		21	2327	724	340	249		400	291	248
v/s Ratio Prot	c0.07	c0.29		0.01	0.25		c0.07	c0.11		0.04	0.04	
v/s Ratio Perm						0.11						0.01
v/c Ratio	0.66	0.52		0.52	0.52	0.24	0.64	0.76		0.31	0.27	0.09
Uniform Delay, d1	43.0	13.4		49.1	18.6	15.8	43.1	41.2		40.2	36.8	35.7
Progression Factor	0.98	0.74		1.37	0.29	0.67	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	5.9	0.9		7.7	0.6	0.6	2.9	11.1		0.2	0.2	0.1
Delay (s)	48.1	10.9		74.8	6.0	11.2	46.0	52.3		40.4	37.0	35.8
Level of Service	D	B		E	A	B	D	D		D	D	D
Approach Delay (s)		14.9			7.7			49.1			37.7	
Approach LOS		B			A			D			D	

Intersection Summary			
HCM Average Control Delay	18.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

16: Oakley Road & Live Oak Ave

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.95		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1828		1770	1776		1770	1837		1770	1841	
Flt Permitted	0.59	1.00		0.70	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1101	1828		1303	1776		1770	1837		1770	1841	
Volume (vph)	13	70	10	50	140	63	40	196	20	45	141	12
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	14	78	11	56	156	70	44	218	22	50	157	13
RTOR Reduction (vph)	0	8	0	0	37	0	0	6	0	0	5	0
Lane Group Flow (vph)	14	81	0	56	189	0	44	234	0	50	165	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	8.7	8.7		8.7	8.7		1.7	16.4		1.7	16.4	
Effective Green, g (s)	9.2	9.2		9.2	9.2		1.7	16.9		1.7	16.9	
Actuated g/C Ratio	0.23	0.23		0.23	0.23		0.04	0.42		0.04	0.42	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	255	423		301	411		76	780		76	782	
v/s Ratio Prot		0.04			c0.11		0.02	c0.13		c0.03	0.09	
v/s Ratio Perm	0.01			0.04								
v/c Ratio	0.05	0.19		0.19	0.46		0.58	0.30		0.66	0.21	
Uniform Delay, d1	11.9	12.3		12.3	13.2		18.7	7.5		18.8	7.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.2		0.3	0.8		10.3	0.2		18.7	0.1	
Delay (s)	12.0	12.5		12.6	14.0		29.0	7.8		37.4	7.4	
Level of Service	B	B		B	B		C	A		D	A	
Approach Delay (s)		12.5			13.7			11.0			14.2	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	12.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	39.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	36.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

23: Neroly Road & Live Oak Ave

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↱			↰↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00	1.00	
Frt		0.96			0.96		1.00	0.96		1.00	0.96	
Flt Protected		0.99			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3387			3355		1770	1792		1770	1794	
Flt Permitted		0.99			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		3387			3355		1770	1792		1770	1794	
Volume (vph)	30	191	75	70	213	117	107	146	50	169	62	20
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	208	82	76	232	127	116	159	54	184	67	22
RTOR Reduction (vph)	0	47	0	0	61	0	0	17	0	0	15	0
Lane Group Flow (vph)	0	276	0	0	374	0	116	196	0	184	74	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)		10.0			11.5		7.3	12.4		9.0	14.1	
Effective Green, g (s)		10.5			12.0		7.3	12.9		9.0	14.6	
Actuated g/C Ratio		0.17			0.20		0.12	0.21		0.15	0.24	
Clearance Time (s)		4.5			4.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		589			667		214	383		264	434	
v/s Ratio Prot		c0.08			c0.11		0.07	c0.11		c0.10	0.04	
v/s Ratio Perm												
v/c Ratio		0.47			0.56		0.54	0.51		0.70	0.17	
Uniform Delay, d1		22.4			21.8		25.0	21.0		24.4	18.1	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.6			1.1		2.8	1.2		7.8	0.2	
Delay (s)		23.0			22.9		27.8	22.1		32.2	18.3	
Level of Service		C			C		C	C		C	B	
Approach Delay (s)		23.0			22.9			24.1			27.7	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	24.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	60.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Mitigation                                      11/01/06
========================================================================
INTERSECTION    11 Bridgehead/Main Street            Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------           120   74  115
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   108 ---  1.0   1.0  1.0  2.0   1.0 ---  342  RIGHT
                                                          STREET NAME:
THRU   727 ---> 2.1  (NO. OF LANES)   3.0<--- 1123  THRU  Main Street

RIGHT  190 ---  1.1   2.0  1.1  1.1   1.0 ---   10  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 200  139   50                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Bridgehead
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)      139        139       1650     0.0842
    LEFT (L)      200        200       3000     0.0667
    T + R                    189       1650     0.1145     0.1145
------------------------------------------------------------------------
SB  RIGHT (R)     120         12 *     1650     0.0073
    THRU (T)       74         74       1650     0.0448
    LEFT (L)      115        115       3000     0.0383     0.0383
------------------------------------------------------------------------
EB  RIGHT (R)     190        190       1650     0.1152
    THRU (T)      727        727       3300     0.2203
    LEFT (L)      108        108       1650     0.0655     0.0655
    T + R                    917       3300     0.2779
------------------------------------------------------------------------
WB  RIGHT (R)     342        279 *     1650     0.1691
    THRU (T)     1123       1123       4950     0.2269     0.2269
    LEFT (L)       10         10       1650     0.0061
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                          0.45
     INTERSECTION LEVEL OF SERVICE:                              A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_MIT.INT,VOL=2010_MIT.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Mitigation                                      11/01/06
========================================================================
INTERSECTION    16 Oakley Rd/Live Oak Ave            Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            12  141   45
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    13 ---  1.0   1.1  1.1  1.0   1.1 ---   63  RIGHT
                                                          STREET NAME:
THRU    70 ---> 1.1  (NO. OF LANES)   1.1<---  140  THRU  Live Oak Ave

RIGHT   10 ---  1.1   1.0  1.1  1.1   1.0 ---   50  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  40  196   20                         Urb=N, Rur=N
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Oakley Rd
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)      196        196       1650     0.1188
    LEFT (L)       40         40       1650     0.0242
    T + R                    216       1650     0.1309     0.1309
------------------------------------------------------------------------
SB  RIGHT (R)      12         12       1650     0.0073
    THRU (T)      141        141       1650     0.0855
    LEFT (L)       45         45       1650     0.0273     0.0273
    T + R                    153       1650     0.0927
------------------------------------------------------------------------
EB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)       70         70       1650     0.0424
    LEFT (L)       13         13       1650     0.0079     0.0079
    T + R                     80       1650     0.0485
------------------------------------------------------------------------
WB  RIGHT (R)      63         63       1650     0.0382
    THRU (T)      140        140       1650     0.0848
    LEFT (L)       50         50       1650     0.0303
    T + R                    203       1650     0.1230     0.1230
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                          0.29
     INTERSECTION LEVEL OF SERVICE:                              A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_MIT.INT,VOL=2010_MIT.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Mitigation                                      11/01/06
========================================================================
INTERSECTION    23 Neroly Rd/Live Oak Ave            Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------            20   62  169
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? Y
LEFT    30 ---  1.1   1.1  1.1  1.0   1.1 ---  117  RIGHT
                                                          STREET NAME:
THRU   191 ---> 2.2  (NO. OF LANES)   2.2<---  213  THRU  Live Oak Ave

RIGHT   75 ---  1.1   1.0  1.1  1.1   1.1 ---   70  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 107  146   50                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Neroly Rd
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)      146        146       1650     0.0885
    LEFT (L)      107        107       1650     0.0648
    T + R                    196       1650     0.1188     0.1188
------------------------------------------------------------------------
SB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)       62         62       1650     0.0376
    LEFT (L)      169        169       1650     0.1024     0.1024
    T + R                     82       1650     0.0497
------------------------------------------------------------------------
EB  RIGHT (R)      75         75       1650     0.0455
    THRU (T)      191        191       3300     0.0579
    LEFT (L)       30         30       1650     0.0182
    T + R                    266       3300     0.0806
    T + L                    221       3300     0.0670
    T + R + L                296       3300     0.0897     0.0897
------------------------------------------------------------------------
WB  RIGHT (R)     117        117       1650     0.0709
    THRU (T)      213        213       3300     0.0645
    LEFT (L)       70         70       1650     0.0424
    T + R                    330       3300     0.1000
    T + L                    283       3300     0.0858
    T + R + L                400       3300     0.1212     0.1212
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                          0.43
     INTERSECTION LEVEL OF SERVICE:                              A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_MIT.INT,VOL=2010_MIT.AM,CAP=
```

Near Term (2010) With Project PM Mitigation

HCM Signalized Intersection Capacity Analysis
11: Main Street & Bridgehead Road

2010 & Proj PM
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑↑	↱	↰↰	↱		↰↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.91	1.00	0.97	1.00		0.97	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	3340		1719	4940	1538	3335	1736		3335	1810	1538
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1719	3340		1719	4940	1538	3335	1736		3335	1810	1538
Volume (vph)	188	1671	390	30	851	181	220	160	60	280	151	172
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	192	1705	398	31	868	185	224	163	61	286	154	176
RTOR Reduction (vph)	0	16	0	0	0	76	0	11	0	0	0	152
Lane Group Flow (vph)	192	2087	0	31	868	109	224	213	0	286	154	24
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot		pm+ov	Prot			Prot		Perm
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases						6						4
Actuated Green, G (s)	17.2	71.1		3.6	57.5	69.5	12.2	16.3		12.0	16.1	16.1
Effective Green, g (s)	17.2	72.1		3.6	58.5	70.5	12.2	16.3		12.0	16.1	16.1
Actuated g/C Ratio	0.14	0.60		0.03	0.49	0.59	0.10	0.14		0.10	0.13	0.13
Clearance Time (s)	4.0	5.0		4.0	5.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	2.0	4.0		2.0	4.0	2.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	246	2007		52	2408	955	339	236		334	243	206
v/s Ratio Prot	0.11	c0.62		0.02	c0.18	0.01	0.07	c0.12		c0.09	0.09	
v/s Ratio Perm						0.06						0.02
v/c Ratio	0.78	1.04		0.60	0.36	0.11	0.66	0.90		0.86	0.63	0.11
Uniform Delay, d1	49.6	24.0		57.5	19.1	10.9	51.9	51.1		53.2	49.2	45.7
Progression Factor	0.97	0.96		0.60	0.27	0.02	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	7.0	25.8		10.3	0.4	0.0	3.7	32.9		18.3	3.9	0.1
Delay (s)	54.9	48.8		44.7	5.5	0.2	55.6	83.9		71.4	53.1	45.8
Level of Service	D	D		D	A	A	E	F		E	D	D
Approach Delay (s)		49.3			5.8			69.8			59.5	
Approach LOS		D			A			E			E	

Intersection Summary			
HCM Average Control Delay	42.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	99.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
16: Oakley Road & Live Oak Ave

2010 & Proj PM
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.94		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1821		1770	1742		1770	1838		1770	1843	
Flt Permitted	0.43	1.00		0.50	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	810	1821		934	1742		1770	1838		1770	1843	
Volume (vph)	27	170	30	40	130	99	30	309	30	160	361	28
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	30	189	33	44	144	110	33	343	33	178	401	31
RTOR Reduction (vph)	0	11	0	0	51	0	0	5	0	0	4	0
Lane Group Flow (vph)	30	211	0	44	203	0	33	371	0	178	428	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	8.7	8.7		8.7	8.7		1.3	21.2		6.7	26.6	
Effective Green, g (s)	9.2	9.2		9.2	9.2		1.8	21.7		7.2	27.1	
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.04	0.43		0.14	0.54	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	149	334		172	320		64	796		254	997	
v/s Ratio Prot		0.12			c0.12		0.02	0.20		c0.10	c0.23	
v/s Ratio Perm	0.04			0.05								
v/c Ratio	0.20	0.63		0.26	0.63		0.52	0.47		0.70	0.43	
Uniform Delay, d1	17.3	18.9		17.5	18.9		23.7	10.1		20.4	6.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	3.8		0.8	4.1		6.9	0.4		8.4	0.3	
Delay (s)	18.0	22.7		18.3	22.9		30.6	10.5		28.9	7.2	
Level of Service	B	C		B	C		C	B		C	A	
Approach Delay (s)		22.2			22.3			12.1			13.5	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	16.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	50.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
23: Neroly Road & Live Oak Ave

2010 & Proj PM
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↱			↰↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00	1.00	
Frt		0.94			0.93		1.00	0.96		1.00	0.97	
Flt Protected		1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3314			3262		1770	1780		1770	1801	
Flt Permitted		1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		3314			3262		1770	1780		1770	1801	
Volume (vph)	20	217	164	80	187	239	84	94	40	251	175	50
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	236	178	87	203	260	91	102	43	273	190	54
RTOR Reduction (vph)	0	147	0	0	207	0	0	20	0	0	13	0
Lane Group Flow (vph)	0	289	0	0	343	0	91	125	0	273	231	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)		10.4			11.1		6.3	11.0		13.2	17.9	
Effective Green, g (s)		10.9			11.6		6.3	11.5		13.2	18.4	
Actuated g/C Ratio		0.17			0.18		0.10	0.18		0.21	0.29	
Clearance Time (s)		4.5			4.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		572			599		176	324		370	524	
v/s Ratio Prot		c0.09			c0.11		0.05	0.07		c0.15	c0.13	
v/s Ratio Perm												
v/c Ratio		0.50			0.57		0.52	0.39		0.74	0.44	
Uniform Delay, d1		23.7			23.5		27.0	22.7		23.4	18.2	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.7			1.3		2.6	0.8		7.5	0.6	
Delay (s)		24.4			24.9		29.6	23.5		30.9	18.8	
Level of Service		C			C		C	C		C	B	
Approach Delay (s)		24.4			24.9			25.8			25.2	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	25.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	63.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Mitigation                                      11/01/06
========================================================================
INTERSECTION    11 Bridgehead/Main Street            Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------           172  151  280
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   188 ---  1.0   1.0  1.0  2.0   1.0 ---  181  RIGHT
                                                          STREET NAME:
THRU  1671 ---> 2.1  (NO. OF LANES)   3.0<---  851  THRU  Main Street

RIGHT  390 ---  1.1   2.0  1.1  1.1   1.0 ---   30  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 220  160   60                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Bridgehead
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      60         60       1650     0.0364
    THRU (T)      160        160       1650     0.0970
    LEFT (L)      220        220       3000     0.0733
    T + R                    220       1650     0.1333     0.1333
------------------------------------------------------------------------
SB  RIGHT (R)     172          0 *     1650     0.0000
    THRU (T)      151        151       1650     0.0915
    LEFT (L)      280        280       3000     0.0933     0.0933
------------------------------------------------------------------------
EB  RIGHT (R)     390        390       1650     0.2364
    THRU (T)     1671       1671       3300     0.5064
    LEFT (L)      188        188       1650     0.1139
    T + R                   2061       3300     0.6245     0.6245
------------------------------------------------------------------------
WB  RIGHT (R)     181         27 *     1650     0.0164
    THRU (T)      851        851       4950     0.1719
    LEFT (L)       30         30       1650     0.0182     0.0182
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.87
     INTERSECTION LEVEL OF SERVICE:                             D
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_MIT.INT,VOL=2010_MIT.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Mitigation                                      11/01/06
========================================================================
INTERSECTION    16 Oakley Rd/Live Oak Ave            Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            28  361  160
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    27 ---  1.0   1.1  1.1  1.0   1.1 ---   99  RIGHT
                                                          STREET NAME:
THRU   170 ---> 1.1  (NO. OF LANES)   1.1<---  130  THRU  Live Oak Ave

RIGHT   30 ---  1.1   1.0  1.1  1.1   1.0 ---   40  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  30  309   30                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Oakley Rd
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      30         30       1650     0.0182
    THRU (T)      309        309       1650     0.1873
    LEFT (L)       30         30       1650     0.0182
    T + R                    339       1650     0.2055     0.2055
------------------------------------------------------------------------
SB  RIGHT (R)      28         28       1650     0.0170
    THRU (T)      361        361       1650     0.2188
    LEFT (L)      160        160       1650     0.0970     0.0970
    T + R                    389       1650     0.2358
------------------------------------------------------------------------
EB  RIGHT (R)      30         30       1650     0.0182
    THRU (T)      170        170       1650     0.1030
    LEFT (L)       27         27       1650     0.0164     0.0164
    T + R                    200       1650     0.1212
------------------------------------------------------------------------
WB  RIGHT (R)      99         99       1650     0.0600
    THRU (T)      130        130       1650     0.0788
    LEFT (L)       40         40       1650     0.0242
    T + R                    229       1650     0.1388     0.1388
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.46
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_MIT.INT,VOL=2010_MIT.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 Mitigation                                      11/01/06
========================================================================
INTERSECTION    23 Neroly Rd/Live Oak Ave            Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------            50  175  251
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? Y
LEFT    20 ---  1.1   1.1  1.1  1.0   1.1 ---  239  RIGHT
                                                          STREET NAME:
THRU   217 ---> 2.2  (NO. OF LANES)   2.2<---  187  THRU  Live Oak Ave

RIGHT  164 ---  1.1   1.0  1.1  1.1   1.1 ---   80  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  84   94   40                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Neroly Rd
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      40         40       1650     0.0242
    THRU (T)       94         94       1650     0.0570
    LEFT (L)       84         84       1650     0.0509
    T + R                    134       1650     0.0812     0.0812
------------------------------------------------------------------------
SB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)      175        175       1650     0.1061
    LEFT (L)      251        251       1650     0.1521     0.1521
    T + R                    225       1650     0.1364
------------------------------------------------------------------------
EB  RIGHT (R)     164        164       1650     0.0994
    THRU (T)      217        217       3300     0.0658
    LEFT (L)       20         20       1650     0.0121
    T + R                    381       3300     0.1155
    T + L                    237       3300     0.0718
    T + R + L                401       3300     0.1215     0.1215
------------------------------------------------------------------------
WB  RIGHT (R)     239        239       1650     0.1448
    THRU (T)      187        187       3300     0.0567
    LEFT (L)       80         80       1650     0.0485
    T + R                    426       3300     0.1291
    T + L                    267       3300     0.0809
    T + R + L                506       3300     0.1533     0.1533
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.51
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_MIT.INT,VOL=2010_MIT.PM,CAP=
```

Cumulative (2030) No Project PM

HCM Signalized Intersection Capacity Analysis
1: Wilbur Avenue & Minaker Drive

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↰	↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	0.98		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.97	1.00
Satd. Flow (prot)	1770	3453		1770	3532			1777	1583		1801	1583
Flt Permitted	0.95	1.00		0.95	1.00			0.72	1.00		0.82	1.00
Satd. Flow (perm)	1770	3453		1770	3532			1343	1583		1521	1583
Volume (vph)	20	260	50	30	760	10	150	5	20	10	5	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	274	53	32	800	11	158	5	21	11	5	21
RTOR Reduction (vph)	0	20	0	0	1	0	0	0	17	0	0	17
Lane Group Flow (vph)	21	307	0	32	810	0	0	163	4	0	16	4
Turn Type	Prot			Prot			Perm		Perm	Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		4
Actuated Green, G (s)	1.2	27.7		1.3	27.8			10.9	10.9		10.9	10.9
Effective Green, g (s)	1.2	27.7		1.3	27.8			10.9	10.9		10.9	10.9
Actuated g/C Ratio	0.02	0.53		0.03	0.54			0.21	0.21		0.21	0.21
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	41	1843		44	1892			282	332		319	332
v/s Ratio Prot	0.01	0.09		c0.02	c0.23							
v/s Ratio Perm								c0.12	0.00		0.01	0.00
v/c Ratio	0.51	0.17		0.73	0.43			0.58	0.01		0.05	0.01
Uniform Delay, d1	25.1	6.2		25.1	7.3			18.4	16.2		16.4	16.2
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	10.4	0.0		45.3	0.2			2.9	0.0		0.1	0.0
Delay (s)	35.4	6.2		70.4	7.4			21.3	16.3		16.4	16.3
Level of Service	D	A		E	A			C	B		B	B
Approach Delay (s)		8.0			9.8			20.7			16.3	
Approach LOS		A			A			C			B	

Intersection Summary			
HCM Average Control Delay	11.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	51.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
2: Wilbur Avenue & Viera Avenue

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱		↰	↑	↰↱	
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	290	30	20	780	70	60
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	305	32	21	821	74	63
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			337		1184	321
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			337		1184	321
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		64	91
cM capacity (veh/h)			1222		205	720

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	337	21	821	137
Volume Left	0	21	0	74
Volume Right	32	0	0	63
cSH	1700	1222	1700	307
Volume to Capacity	0.20	0.02	0.48	0.45
Queue Length 95th (ft)	0	1	0	55
Control Delay (s)	0.0	8.0	0.0	25.9
Lane LOS		A		D
Approach Delay (s)	0.0	0.2		25.9
Approach LOS				D

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	55.3%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
3: Wilbur Avenue & SR 160 SB Off

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱		↰	↑↑					↰		↱
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	230	110	280	640	0	0	0	0	70	0	120
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	242	116	295	674	0	0	0	0	74	0	126
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	674			358			1226	1563	300	1563	1621	337
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	674			358			1226	1563	300	1563	1621	337
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			75			100	100	100	0	100	81
cM capacity (veh/h)	913			1197			88	83	696	61	77	659

Direction, Lane #	EB 1	WB 1	WB 2	WB 3	SB 1	SB 2
Volume Total	358	295	337	337	74	126
Volume Left	0	295	0	0	74	0
Volume Right	116	0	0	0	0	126
cSH	1700	1197	1700	1700	61	659
Volume to Capacity	0.21	0.25	0.20	0.20	1.20	0.19
Queue Length 95th (ft)	0	24	0	0	152	18
Control Delay (s)	0.0	9.0	0.0	0.0	293.9	11.8
Lane LOS		A			F	B
Approach Delay (s)	0.0	2.7			115.7	
Approach LOS					F	

Intersection Summary			
Average Delay	16.9		
Intersection Capacity Utilization	50.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
4: Wilbur Avenue & SR 160 NB On

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑			↑↱		↰		↱			
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	50	250	0	0	660	140	260	0	280	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	53	263	0	0	695	147	274	0	295	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	842			263			716	1211	132	1005	1137	421
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	842			263			716	1211	132	1005	1137	421
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	93			100			9	100	67	100	100	100
cM capacity (veh/h)	789			1298			301	169	893	124	187	581

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2
Volume Total	53	132	132	463	379	274	295
Volume Left	53	0	0	0	0	274	0
Volume Right	0	0	0	0	147	0	295
cSH	789	1700	1700	1700	1700	301	893
Volume to Capacity	0.07	0.08	0.08	0.27	0.22	0.91	0.33
Queue Length 95th (ft)	5	0	0	0	0	214	36
Control Delay (s)	9.9	0.0	0.0	0.0	0.0	69.1	11.0
Lane LOS	A					F	B
Approach Delay (s)	1.6			0.0		39.0	
Approach LOS						E	

Intersection Summary			
Average Delay	13.1		
Intersection Capacity Utilization	50.4%	ICU Level of Service	A
Analysis Period (min)	15		

5: Wilbur Avenue & Bridgehead Road

	↱	→	↘	↙	←	↖	↰	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	30	440	60	30	450	10	330	30	100	10	30	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	463	63	32	474	11	347	32	105	11	32	21

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1
Volume Total (vph)	32	526	516	484	63
Volume Left (vph)	32	0	32	347	11
Volume Right (vph)	0	63	11	105	21
Hadj (s)	0.53	-0.05	0.03	0.05	-0.13
Departure Headway (s)	8.5	7.9	7.6	7.4	9.4
Degree Utilization, x	0.07	1.15	1.08	1.00	0.16
Capacity (veh/h)	415	460	487	484	378
Control Delay (s)	11.0	117.3	93.1	68.4	14.2
Approach Delay (s)	111.3		93.1	68.4	14.2
Approach LOS	F		F	F	B

Intersection Summary			
Delay	88.9		
HCM Level of Service	F		
Intersection Capacity Utilization	88.3%	ICU Level of Service	E
Analysis Period (min)	15		

6: E 18th Street & Hillcrest Avenue

	↱	→	↘	↙	←	↖	↰	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↱		↰	↑	↱	↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3417		1770	3486		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3417		1770	3486		1770	1863	1583	1770	1863	1583
Volume (vph)	20	300	90	210	450	50	230	100	220	50	90	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	316	95	221	474	53	242	105	232	53	95	63
RTOR Reduction (vph)	0	30	0	0	8	0	0	0	177	0	0	55
Lane Group Flow (vph)	21	381	0	221	519	0	242	105	55	53	95	8
Turn Type	Prot			Prot			Split		Perm	Split		Perm
Protected Phases	1	6		5	2		8	8		4	4	
Permitted Phases									8			4
Actuated Green, G (s)	1.3	14.9		9.2	23.3		13.5	13.5	13.5	6.9	6.9	6.9
Effective Green, g (s)	2.3	16.9		10.7	25.3		15.0	15.0	15.0	8.4	8.4	8.4
Actuated g/C Ratio	0.04	0.27		0.17	0.40		0.24	0.24	0.24	0.13	0.13	0.13
Clearance Time (s)	4.0	5.0		4.5	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	65	917		301	1400		421	444	377	236	248	211
v/s Ratio Prot	0.01	0.11		c0.12	c0.15		c0.14	0.06		0.03	c0.05	
v/s Ratio Perm									0.03			0.01
v/c Ratio	0.32	0.42		0.73	0.37		0.57	0.24	0.15	0.22	0.38	0.04
Uniform Delay, d1	29.6	19.0		24.8	13.3		21.2	19.4	18.9	24.4	24.9	23.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.9	0.3		8.9	0.2		1.9	0.3	0.2	0.5	1.0	0.1
Delay (s)	32.5	19.3		33.7	13.4		23.1	19.7	19.1	24.9	25.9	23.9
Level of Service	C	B		C	B		C	B	B	C	C	C
Approach Delay (s)		19.9			19.4			20.9			25.0	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM Average Control Delay	20.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	63.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	52.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

7: E 18th Street & Viera Avenue

	↱	→	↘	↙	←	↖	↰	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑↱			↰↑	↱		✥	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	0.96			1.00	0.85		0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00		0.99	
Satd. Flow (prot)	1770	3539	1583	1770	3397			1788	1583		1689	
Flt Permitted	0.35	1.00	1.00	0.55	1.00			0.72	1.00		0.91	
Satd. Flow (perm)	658	3539	1583	1022	3397			1349	1583		1555	
Volume (vph)	110	320	60	20	490	180	150	30	40	30	20	80
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	116	337	63	21	516	189	158	32	42	32	21	84
RTOR Reduction (vph)	0	0	26	0	58	0	0	0	30	0	59	0
Lane Group Flow (vph)	116	337	37	21	647	0	0	190	12	0	78	0
Turn Type	Perm		Perm	Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	26.3	26.3	26.3	26.3	26.3			12.8	12.8		12.8	
Effective Green, g (s)	27.3	27.3	27.3	27.3	27.3			13.8	13.8		13.8	
Actuated g/C Ratio	0.58	0.58	0.58	0.58	0.58			0.29	0.29		0.29	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	381	2051	918	592	1969			395	464		456	
v/s Ratio Prot		0.10			c0.19							
v/s Ratio Perm	0.18		0.02	0.02				c0.14	0.01		0.05	
v/c Ratio	0.30	0.16	0.04	0.04	0.33			0.48	0.03		0.17	
Uniform Delay, d1	5.1	4.6	4.3	4.2	5.1			13.7	11.9		12.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.5	0.0	0.0	0.0	0.1			0.9	0.0		0.2	
Delay (s)	5.5	4.6	4.3	4.3	5.2			14.6	11.9		12.6	
Level of Service	A	A	A	A	A			B	B		B	
Approach Delay (s)		4.8			5.2			14.1			12.6	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	7.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	47.1	Sum of lost time (s)	6.0
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

8: E 18th Street & Phillips Lane

	↱	→	↘	↙	←	↖	↰	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑	↱	↰	↑↱		↰↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.97	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.90		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3522		1770	3539	1583	1770	1679		3433	1631	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3522		1770	3539	1583	1770	1679		3433	1631	
Volume (vph)	80	320	10	20	640	70	20	10	20	40	10	50
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	337	11	21	674	74	21	11	21	42	11	53
RTOR Reduction (vph)	0	3	0	0	0	49	0	17	0	0	43	0
Lane Group Flow (vph)	84	345	0	21	674	25	21	15	0	42	21	0
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	5	2		1	6		4	7		8	3	
Permitted Phases						6						
Actuated Green, G (s)	3.4	17.4		0.5	14.5	14.5	0.5	7.6		1.1	8.2	
Effective Green, g (s)	3.4	17.4		0.5	14.5	14.5	0.5	7.6		1.1	8.2	
Actuated g/C Ratio	0.08	0.41		0.01	0.34	0.34	0.01	0.18		0.03	0.19	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	141	1439		21	1205	539	21	300		89	314	
v/s Ratio Prot	c0.05	c0.10		0.01	c0.19		0.01	0.01		c0.01	c0.01	
v/s Ratio Perm						0.02						
v/c Ratio	0.60	0.24		1.00	0.56	0.05	1.00	0.05		0.47	0.07	
Uniform Delay, d1	18.9	8.3		21.1	11.4	9.4	21.1	14.5		20.5	14.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.6	0.1		196.4	0.6	0.0	196.4	0.1		3.9	0.1	
Delay (s)	25.5	8.3		217.4	12.0	9.5	217.4	14.6		24.4	14.2	
Level of Service	C	A		F	B	A	F	B		C	B	
Approach Delay (s)		11.7			17.4			95.0			18.2	
Approach LOS		B			B			F			B	

Intersection Summary			
HCM Average Control Delay	18.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	42.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	39.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

9: E 18th Street & SR 160 SB Off

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↳		↰↰	↑↑	↱		↲	↱	↰	↳	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85		1.00	0.85	1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1719	3366		3335	3438	1538		1730	1538	1719	1646	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.70	1.00	0.53	1.00	
Satd. Flow (perm)	1719	3366		3335	3438	1538		1275	1538	957	1646	
Volume (vph)	10	310	50	960	590	90	120	10	140	40	20	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	326	53	1011	621	95	126	11	147	42	21	32
RTOR Reduction (vph)	0	12	0	0	0	26	0	0	0	0	27	0
Lane Group Flow (vph)	11	367	0	1011	621	69	0	137	147	42	26	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot		Perm	Perm		Free	Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases						6	8		Free	4		
Actuated Green, G (s)	0.8	29.3		43.2	71.7	71.7		14.5	100.0	14.5	14.5	
Effective Green, g (s)	0.8	30.3		43.2	72.7	72.7		14.5	100.0	14.5	14.5	
Actuated g/C Ratio	0.01	0.30		0.43	0.73	0.73		0.14	1.00	0.14	0.14	
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0		4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	4.0	4.0		2.0		2.0	2.0	
Lane Grp Cap (vph)	14	1020		1441	2499	1118		185	1538	139	239	
v/s Ratio Prot	0.01	c0.11		c0.30	0.18						0.02	
v/s Ratio Perm						0.04		c0.11	0.10	0.04		
v/c Ratio	0.79	0.36		0.70	0.25	0.06		0.74	0.10	0.30	0.11	
Uniform Delay, d1	49.5	27.3		23.1	4.5	3.9		40.9	0.0	38.2	37.1	
Progression Factor	1.00	1.00		0.73	1.02	1.34		1.00	1.00	1.00	1.00	
Incremental Delay, d2	130.6	1.0		1.5	0.2	0.1		13.0	0.1	0.4	0.1	
Delay (s)	180.1	28.3		18.3	4.8	5.3		53.9	0.1	38.7	37.2	
Level of Service	F	C		B	A	A		D	A	D	D	
Approach Delay (s)		32.5			12.7			26.1			37.9	
Approach LOS		C			B			C			D	

Intersection Summary			
HCM Average Control Delay	18.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

10: Main Street & SR 160 NB On

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↳		↰	↑↑↑	↰	↱↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		1.00	0.91	1.00	0.88
Frt	0.98		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	4819		1719	4940	1719	2707
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	4819		1719	4940	1719	2707
Volume (vph)	410	80	100	1460	180	1110
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	432	84	105	1537	189	1168
RTOR Reduction (vph)	24	0	0	0	0	278
Lane Group Flow (vph)	492	0	105	1537	189	890
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Turn Type			Prot			pm+ov
Protected Phases	2		1	6	8	1
Permitted Phases						8
Actuated Green, G (s)	48.2		23.0	76.2	14.8	37.8
Effective Green, g (s)	49.2		24.0	77.2	14.8	38.8
Actuated g/C Ratio	0.49		0.24	0.77	0.15	0.39
Clearance Time (s)	5.0		5.0	5.0	4.0	5.0
Vehicle Extension (s)	4.0		3.0	4.0	2.0	3.0
Lane Grp Cap (vph)	2371		413	3814	254	1159
v/s Ratio Prot	0.10		0.06	c0.31	0.11	c0.18
v/s Ratio Perm						0.14
v/c Ratio	0.21		0.25	0.40	0.74	0.77
Uniform Delay, d1	14.4		30.8	3.8	40.8	26.7
Progression Factor	0.41		0.93	0.12	1.00	1.00
Incremental Delay, d2	0.2		0.3	0.3	9.9	3.1
Delay (s)	6.1		29.0	0.7	50.7	29.8
Level of Service	A		C	A	D	C
Approach Delay (s)	6.1			2.5	32.7	
Approach LOS	A			A	C	

Intersection Summary			
HCM Average Control Delay	14.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

11: Main Street & Bridgehead Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↳		↰	↑↑↑	↱	↰↰	↳		↰↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00	0.97	1.00		0.97	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	4818		1719	4940	1538	3335	1737		3335	1810	1538
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1719	4818		1719	4940	1538	3335	1737		3335	1810	1538
Volume (vph)	180	1120	220	50	1220	350	260	110	40	100	110	80
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	189	1179	232	53	1284	368	274	116	42	105	116	84
RTOR Reduction (vph)	0	20	0	0	0	194	0	17	0	0	0	74
Lane Group Flow (vph)	189	1391	0	53	1284	174	274	141	0	105	116	10
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot		Perm	Split			Split		Perm
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases						6						7
Actuated Green, G (s)	12.5	53.4		5.4	46.3	46.3	12.2	12.2		12.0	12.0	12.0
Effective Green, g (s)	12.5	54.4		5.4	47.3	47.3	12.2	12.2		12.0	12.0	12.0
Actuated g/C Ratio	0.12	0.54		0.05	0.47	0.47	0.12	0.12		0.12	0.12	0.12
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	215	2621		93	2337	727	407	212		400	217	185
v/s Ratio Prot	c0.11	c0.29		0.03	0.26		c0.08	0.08		0.03	c0.06	
v/s Ratio Perm						0.11						0.01
v/c Ratio	0.88	0.53		0.57	0.55	0.24	0.67	0.67		0.26	0.53	0.05
Uniform Delay, d1	43.0	14.6		46.2	18.8	15.7	42.0	42.0		40.0	41.4	39.0
Progression Factor	1.05	0.60		1.07	0.69	1.08	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	24.1	0.6		4.4	0.9	0.7	3.4	6.0		0.1	1.3	0.0
Delay (s)	69.3	9.4		53.8	13.8	17.7	45.4	48.0		40.1	42.6	39.0
Level of Service	E	A		D	B	B	D	D		D	D	D
Approach Delay (s)		16.4			15.9			46.4			40.8	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM Average Control Delay	21.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

12: Main Street & Sandy Lane

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↳		↰	↑↑↑	↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		1.00	0.91	1.00	1.00
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	4905		1719	4940	1719	1538
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	4905		1719	4940	1719	1538
Volume (vph)	1200	60	50	1600	20	50
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1263	63	53	1684	21	53
RTOR Reduction (vph)	3	0	0	0	0	50
Lane Group Flow (vph)	1323	0	53	1684	21	3
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Turn Type			Prot			custom
Protected Phases	2		1	6		
Permitted Phases					4	4
Actuated Green, G (s)	63.2		17.6	84.8	5.7	5.7
Effective Green, g (s)	63.7		18.1	85.8	6.2	6.2
Actuated g/C Ratio	0.64		0.18	0.86	0.06	0.06
Clearance Time (s)	4.5		4.5	5.0	4.5	4.5
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	3124		311	4239	107	95
v/s Ratio Prot	c0.27		0.03	c0.34		
v/s Ratio Perm					c0.01	0.00
v/c Ratio	0.42		0.17	0.40	0.20	0.03
Uniform Delay, d1	9.0		34.6	1.5	44.5	44.1
Progression Factor	0.66		1.25	0.25	1.00	1.00
Incremental Delay, d2	0.4		0.2	0.2	0.9	0.1
Delay (s)	6.3		43.6	0.6	45.4	44.2
Level of Service	A		D	A	D	D
Approach Delay (s)	6.3			1.9	44.6	
Approach LOS	A			A	D	

Intersection Summary			
HCM Average Control Delay	4.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

13: Main Street & Live Oak Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑	↱	↰	↑↑↱		↰	↑↱		↰↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91		1.00	0.95		0.97	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.97		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	4940	1538	1719	4854		1719	3426		3433	3362	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	4940	1538	1719	4854		1719	3426		3433	3362	
Volume (vph)	170	960	120	50	1500	250	130	230	50	80	40	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	179	1011	126	53	1579	263	137	242	53	84	42	21
RTOR Reduction (vph)	0	0	54	0	18	0	0	22	0	0	20	0
Lane Group Flow (vph)	179	1011	72	53	1824	0	137	273	0	84	43	0
Heavy Vehicles (%)	2%	5%	5%	5%	5%	2%	5%	2%	5%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2		6							
Actuated Green, G (s)	11.7	56.4	56.4	7.4	52.1		12.6	15.2		4.0	5.6	
Effective Green, g (s)	11.7	57.4	57.4	7.4	53.1		13.6	15.2		4.0	5.6	
Actuated g/C Ratio	0.12	0.57	0.57	0.07	0.53		0.14	0.15		0.04	0.06	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		5.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	207	2836	883	127	2577		234	521		137	188	
v/s Ratio Prot	c0.10	0.20		0.03	c0.38		c0.08	c0.08		0.02	0.01	
v/s Ratio Perm			0.05									
v/c Ratio	0.86	0.36	0.08	0.42	0.71		0.59	0.52		0.61	0.23	
Uniform Delay, d1	43.4	11.4	9.5	44.2	17.6		40.6	39.1		47.2	45.1	
Progression Factor	0.70	0.66	0.79	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	27.7	0.3	0.2	2.2	1.7		3.7	1.0		7.9	0.6	
Delay (s)	58.2	7.8	7.7	46.5	19.3		44.3	40.0		55.1	45.8	
Level of Service	E	A	A	D	B		D	D		E	D	
Approach Delay (s)		14.7			20.1			41.4			51.1	
Approach LOS		B			C			D			D	

Intersection Summary			
HCM Average Control Delay	21.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

14: Main Street & Big Break Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↑↱			↰↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.97	1.00
Satd. Flow (prot)	1770	3438	1583	1770	3438	1583	1770	1723			1799	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.50	1.00			0.76	1.00
Satd. Flow (perm)	1770	3438	1583	1770	3438	1583	932	1723			1419	1583
Volume (vph)	190	840	60	60	1560	80	90	20	20	100	40	170
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	200	884	63	63	1642	84	95	21	21	105	42	179
RTOR Reduction (vph)	0	0	21	0	0	30	0	18	0	0	0	153
Lane Group Flow (vph)	200	884	42	63	1642	54	95	24	0	0	147	26
Heavy Vehicles (%)	2%	5%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot		custom	Prot		custom	Perm			Perm		Perm
Protected Phases	5			1				3			7	
Permitted Phases		2	2		6	6	3			7		7
Actuated Green, G (s)	16.8	65.9	65.9	6.5	55.6	55.6	13.6	13.6			13.6	13.6
Effective Green, g (s)	16.8	66.9	66.9	6.5	56.6	56.6	14.6	14.6			14.6	14.6
Actuated g/C Ratio	0.17	0.67	0.67	0.06	0.57	0.57	0.15	0.15			0.15	0.15
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0	5.0	5.0	5.0			5.0	5.0
Vehicle Extension (s)	3.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)	297	2300	1059	115	1946	896	136	252			207	231
v/s Ratio Prot	c0.11			0.04				0.01				
v/s Ratio Perm		0.26	0.03		c0.48	0.03	0.10				c0.10	0.02
v/c Ratio	0.67	0.38	0.04	0.55	0.84	0.06	0.70	0.10			0.71	0.11
Uniform Delay, d1	39.0	7.4	5.6	45.3	18.0	9.7	40.6	37.0			40.7	37.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	5.9	0.5	0.1	2.8	4.7	0.1	11.9	0.1			9.2	0.1
Delay (s)	44.9	7.9	5.7	48.2	22.7	9.9	52.5	37.0			49.8	37.2
Level of Service	D	A	A	D	C	A	D	D			D	D
Approach Delay (s)		14.2			23.0			47.8			42.9	
Approach LOS		B			C			D			D	

Intersection Summary			
HCM Average Control Delay	22.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

15: Oakley Road & Neroly Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	20	70	20	20	220	150	180	280	20	90	210	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	74	21	21	232	158	189	295	21	95	221	21

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	116	411	505	337
Volume Left (vph)	21	21	189	95
Volume Right (vph)	21	158	21	21
Hadj (s)	-0.04	-0.19	0.08	0.05
Departure Headway (s)	8.4	7.1	7.0	7.4
Degree Utilization, x	0.27	0.81	0.98	0.69
Capacity (veh/h)	378	411	505	476
Control Delay (s)	14.5	33.5	60.5	25.2
Approach Delay (s)	14.5	33.5	60.5	25.2
Approach LOS	B	D	F	D

Intersection Summary			
Delay	39.8		
HCM Level of Service	E		
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		

16: Oakley Road & Live Oak Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	20	160	10	70	280	160	50	180	50	80	90	30
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	168	11	74	295	168	53	189	53	84	95	32

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	200	537	295	211
Volume Left (vph)	21	74	53	84
Volume Right (vph)	11	168	53	32
Hadj (s)	0.02	-0.13	-0.04	0.02
Departure Headway (s)	7.0	6.1	6.8	7.1
Degree Utilization, x	0.39	0.90	0.56	0.42
Capacity (veh/h)	474	575	496	468
Control Delay (s)	14.3	41.3	18.1	15.1
Approach Delay (s)	14.3	41.3	18.1	15.1
Approach LOS	B	E	C	C

Intersection Summary			
Delay	27.0		
HCM Level of Service	D		
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
17: Oakley Road & Empire Avenue

2030 AM with Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↑	↱		↰↑	↱	↰	↑↑↱		↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95		1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1696	1583		1804	1583	1770	3521		1770	1863	1583
Flt Permitted	0.95	0.96	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1696	1583		1804	1583	1770	3521		1770	1863	1583
Volume (vph)	140	10	190	20	10	20	380	550	20	50	290	110
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	147	11	200	21	11	21	400	579	21	53	305	116
RTOR Reduction (vph)	0	0	182	0	0	19	0	3	0	0	0	82
Lane Group Flow (vph)	77	81	18	0	32	2	400	597	0	53	305	34
Turn Type	Split		Perm	Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8						6
Actuated Green, G (s)	5.1	5.1	5.1		3.7	3.7	14.1	27.9		2.5	16.3	16.3
Effective Green, g (s)	5.1	5.1	5.1		4.7	4.7	15.1	28.9		3.5	17.3	17.3
Actuated g/C Ratio	0.09	0.09	0.09		0.08	0.08	0.26	0.50		0.06	0.30	0.30
Clearance Time (s)	4.0	4.0	4.0		5.0	5.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	147	149	139		146	128	459	1748		106	554	471
v/s Ratio Prot	0.05	c0.05			c0.02		c0.23	0.17		0.03	c0.16	
v/s Ratio Perm			0.01			0.00						0.02
v/c Ratio	0.52	0.54	0.13		0.22	0.01	0.87	0.34		0.50	0.55	0.07
Uniform Delay, d1	25.4	25.4	24.5		25.0	24.6	20.6	8.9		26.5	17.2	14.7
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	3.3	4.0	0.4		0.8	0.0	16.4	0.1		3.7	1.2	0.1
Delay (s)	28.7	29.4	24.9		25.8	24.7	37.0	9.0		30.2	18.4	14.8
Level of Service	C	C	C		C	C	D	A		C	B	B
Approach Delay (s)		26.8			25.3			20.2			18.8	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	21.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	58.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	57.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: Main Street & Charles Way

2030 AM with Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑↱		↰↰	↑	↱		↰↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.98	1.00
Satd. Flow (prot)	1719	3539	1538	1770	3531		3335	1810	1583		1797	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.98	1.00
Satd. Flow (perm)	1719	3539	1538	1770	3531		3335	1810	1583		1797	1538
Volume (vph)	20	710	200	210	1210	20	490	20	200	20	40	50
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	747	211	221	1274	21	516	21	211	21	42	53
RTOR Reduction (vph)	0	0	142	0	1	0	0	0	160	0	0	51
Lane Group Flow (vph)	21	747	69	221	1294	0	516	21	51	0	63	2
Heavy Vehicles (%)	5%	2%	5%	2%	2%	2%	5%	5%	2%	2%	5%	5%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	1.4	22.2	22.2	11.1	31.9		16.1	16.1	16.1		2.9	2.9
Effective Green, g (s)	2.4	23.2	23.2	12.1	32.9		17.1	17.1	17.1		2.9	2.9
Actuated g/C Ratio	0.03	0.33	0.33	0.17	0.46		0.24	0.24	0.24		0.04	0.04
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	58	1152	500	300	1629		800	434	380		73	63
v/s Ratio Prot	0.01	0.21		c0.12	c0.37		c0.15	0.01			c0.04	
v/s Ratio Perm			0.04						0.03			0.00
v/c Ratio	0.36	0.65	0.14	0.74	0.79		0.65	0.05	0.13		0.86	0.03
Uniform Delay, d1	33.7	20.6	17.0	28.1	16.3		24.4	20.8	21.3		34.0	32.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.8	1.3	0.1	9.1	2.8		1.8	0.0	0.2		60.7	0.2
Delay (s)	37.5	21.8	17.1	37.2	19.1		26.2	20.9	21.4		94.7	33.1
Level of Service	D	C	B	D	B		C	C	C		F	C
Approach Delay (s)		21.2			21.7			24.7			66.6	
Approach LOS		C			C			C			E	

Intersection Summary			
HCM Average Control Delay	23.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	71.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
19: Main Street & Vintage Parkway

2030 AM with Ramps
11/6/2006

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑	↑↑↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3498		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3539	3498		1770	1583
Volume (vph)	90	410	480	40	60	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	432	505	42	63	32
RTOR Reduction (vph)	0	0	6	0	0	28
Lane Group Flow (vph)	95	432	541	0	63	4
Turn Type	Prot					Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	4.3	39.6	31.3		6.6	6.6
Effective Green, g (s)	4.3	40.6	32.3		6.6	6.6
Actuated g/C Ratio	0.08	0.74	0.59		0.12	0.12
Clearance Time (s)	4.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	138	2603	2047		212	189
v/s Ratio Prot	c0.05	0.12	c0.15		c0.04	
v/s Ratio Perm						0.00
v/c Ratio	0.69	0.17	0.26		0.30	0.02
Uniform Delay, d1	24.8	2.2	5.6		22.2	21.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	13.4	0.0	0.1		0.8	0.0
Delay (s)	38.2	2.2	5.7		23.0	21.5
Level of Service	D	A	A		C	C
Approach Delay (s)		8.7	5.7		22.5	
Approach LOS		A	A		C	

Intersection Summary			
HCM Average Control Delay	8.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	55.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	32.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: Main Street & O'Hara Avenue

2030 AM with Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑↱			↰↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.91			0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1770	1863	1583	1770	1851		1770	1695			1826	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.71	1.00			0.94	
Satd. Flow (perm)	1770	1863	1583	1770	1851		1330	1695			1734	
Volume (vph)	10	420	80	40	450	20	110	40	60	20	90	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	442	84	42	474	21	116	42	63	21	95	11
RTOR Reduction (vph)	0	0	38	0	2	0	0	51	0	0	6	0
Lane Group Flow (vph)	11	442	46	42	493	0	116	54	0	0	121	0
Turn Type	Prot		Perm	Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4				2			6		
Actuated Green, G (s)	0.7	28.9	28.9	1.5	29.7		10.2	10.2			10.7	
Effective Green, g (s)	0.7	29.9	29.9	1.5	30.7		10.7	10.7			10.7	
Actuated g/C Ratio	0.01	0.55	0.55	0.03	0.57		0.20	0.20			0.20	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		4.5	4.5			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	23	1030	875	49	1050		263	335			343	
v/s Ratio Prot	0.01	0.24		c0.02	c0.27			0.03				
v/s Ratio Perm			0.03				c0.09				0.07	
v/c Ratio	0.48	0.43	0.05	0.86	0.47		0.44	0.16			0.35	
Uniform Delay, d1	26.5	7.1	5.6	26.2	6.9		19.1	18.0			18.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	14.8	0.3	0.0	76.5	0.3		1.2	0.2			0.6	
Delay (s)	41.4	7.4	5.6	102.7	7.2		20.3	18.2			19.3	
Level of Service	D	A	A	F	A		C	B			B	
Approach Delay (s)		7.8			14.7			19.3			19.3	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM Average Control Delay	13.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	54.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
21: Cypress Road & Empire Avenue

2030 AM with Ramps
11/6/2006

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↱		↰	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3469		1770	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	3469		1770	3539
Volume (vph)	210	220	780	120	120	430
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	221	232	821	126	126	453
RTOR Reduction (vph)	0	179	18	0	0	0
Lane Group Flow (vph)	221	53	929	0	126	453
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	11.5	11.5	21.1		6.1	31.2
Effective Green, g (s)	12.0	12.0	22.1		6.1	32.2
Actuated g/C Ratio	0.23	0.23	0.42		0.12	0.62
Clearance Time (s)	4.5	4.5	5.0		4.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	407	364	1469		207	2183
v/s Ratio Prot	c0.12		c0.27		c0.07	0.13
v/s Ratio Perm		0.03				
v/c Ratio	0.54	0.15	0.63		0.61	0.21
Uniform Delay, d1	17.7	16.0	11.9		21.9	4.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.5	0.2	0.9		5.0	0.0
Delay (s)	19.2	16.2	12.7		26.9	4.4
Level of Service	B	B	B		C	A
Approach Delay (s)	17.7		12.7			9.3
Approach LOS	B		B			A

Intersection Summary			
HCM Average Control Delay	12.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	52.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
22: Cypress Road & Main Street

2030 AM with Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↱	↱	↰	↑↑	↱	↰↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	0.95	1.00	0.95	1.00	0.97	0.95	
Frt	1.00	0.97		1.00	0.92	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3423		1770	1633	1504	1770	3539	1583	3433	3527	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3423		1770	1633	1504	1770	3539	1583	3433	3527	
Volume (vph)	40	180	50	380	280	1070	90	520	220	410	450	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	189	53	400	295	1126	95	547	232	432	474	11
RTOR Reduction (vph)	0	31	0	0	45	62	0	0	25	0	2	0
Lane Group Flow (vph)	42	211	0	400	563	751	95	547	207	432	483	0
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		
Protected Phases	7	4		3	8	1	5	2	3	1	6	
Permitted Phases						8			2			
Actuated Green, G (s)	2.2	10.1		19.3	27.2	38.3	6.6	17.2	36.5	11.1	21.7	
Effective Green, g (s)	2.2	10.1		19.3	27.2	38.3	6.6	17.2	36.5	11.1	21.7	
Actuated g/C Ratio	0.03	0.14		0.26	0.37	0.52	0.09	0.23	0.50	0.15	0.29	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	53	469		464	603	863	159	826	870	517	1038	
v/s Ratio Prot	0.02	0.06		c0.23	c0.34	c0.13	0.05	c0.15	0.06	0.13	0.14	
v/s Ratio Perm						0.37			0.07			
v/c Ratio	0.79	0.45		0.86	0.93	0.87	0.60	0.66	0.24	0.84	0.47	
Uniform Delay, d1	35.5	29.2		25.9	22.4	15.5	32.3	25.6	10.6	30.4	21.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	54.5	0.7		15.1	21.7	9.5	5.9	2.0	0.1	11.2	0.3	
Delay (s)	90.1	29.9		41.1	44.1	25.0	38.2	27.6	10.8	41.6	21.6	
Level of Service	F	C		D	D	C	D	C	B	D	C	
Approach Delay (s)		38.8			34.9			24.3			31.0	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	31.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	73.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
23: Neroly Road & Live Oak Ave

2030 AM with Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↱			↰↑↱			↰↑↱	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	20	150	70	60	270	80	250	140	150	70	20	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	158	74	63	284	84	263	147	158	74	21	21

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	100	153	205	226	568	116
Volume Left (vph)	21	0	63	0	263	74
Volume Right (vph)	0	74	0	84	158	21
Hadj (s)	0.14	-0.30	0.19	-0.23	-0.04	0.05
Departure Headway (s)	7.9	7.4	7.6	7.2	6.2	7.4
Degree Utilization, x	0.22	0.32	0.43	0.45	0.97	0.24
Capacity (veh/h)	447	477	470	500	581	463
Control Delay (s)	11.9	12.6	15.1	14.7	55.0	12.7
Approach Delay (s)	12.3		14.9		55.0	12.7
Approach LOS	B		B		F	B

Intersection Summary			
Delay	30.9		
HCM Level of Service	D		
Intersection Capacity Utilization	61.6%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
24: Laurel Road & Live Oak Avenue

2030 AM with Ramps
11/6/2006

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰↰	↑↑↑	↑↑↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	0.91	0.91		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3433	5085	5038		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	3433	5085	5038		1770	1583
Volume (vph)	290	1020	1830	120	60	310
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	305	1074	1926	126	63	326
RTOR Reduction (vph)	0	0	7	0	0	173
Lane Group Flow (vph)	305	1074	2045	0	63	153
Turn Type	Prot					Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	9.0	49.4	36.4		11.8	11.8
Effective Green, g (s)	9.0	50.4	37.4		12.8	12.8
Actuated g/C Ratio	0.13	0.71	0.53		0.18	0.18
Clearance Time (s)	4.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	434	3599	2646		318	285
v/s Ratio Prot	c0.09	0.21	c0.41		0.04	
v/s Ratio Perm						c0.10
v/c Ratio	0.70	0.30	0.77		0.20	0.54
Uniform Delay, d1	29.8	3.9	13.5		24.8	26.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	5.1	0.0	1.5		0.3	1.9
Delay (s)	34.9	3.9	15.0		25.1	28.4
Level of Service	C	A	B		C	C
Approach Delay (s)		10.8	15.0		27.9	
Approach LOS		B	B		C	

Intersection Summary			
HCM Average Control Delay	14.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	71.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

25: Laurel Road & Empire Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.98		1.00	0.98		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3447		1770	3453		1770	3486		1770	3191	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3447		1770	3453		1770	3486		1770	3191	
Volume (vph)	220	710	150	60	1350	260	180	450	50	50	220	420
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	232	747	158	63	1421	274	189	474	53	53	232	442
RTOR Reduction (vph)	0	13	0	0	12	0	0	6	0	0	161	0
Lane Group Flow (vph)	232	892	0	63	1683	0	189	521	0	53	513	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	17.0	72.1		7.7	62.8		14.0	31.0		4.8	21.8	
Effective Green, g (s)	17.0	72.1		7.7	62.8		14.0	31.0		4.8	21.8	
Actuated g/C Ratio	0.13	0.55		0.06	0.48		0.11	0.24		0.04	0.17	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	229	1889		104	1648		188	821		65	529	
v/s Ratio Prot	c0.13	0.26		0.04	c0.49		c0.11	0.15		0.03	c0.16	
v/s Ratio Perm												
v/c Ratio	1.01	0.47		0.61	1.02		1.01	0.63		0.82	1.06dr	
Uniform Delay, d1	57.3	18.1		60.5	34.4		58.8	45.2		63.0	54.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	62.9	0.2		9.6	27.7		67.0	1.6		52.3	31.1	
Delay (s)	120.2	18.3		70.1	62.1		125.8	46.8		115.2	85.7	
Level of Service	F	B		E	E		F	D		F	F	
Approach Delay (s)		39.1			62.4			67.7			87.8	
Approach LOS		D			E			E			F	

Intersection Summary			
HCM Average Control Delay	61.4	HCM Level of Service	E
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	131.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	100.7%	ICU Level of Service	G
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project WITH RAMPS                           10/24/06
========================================================================
INTERSECTION     1 Minaker/Wilbur                    Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            20    5   10
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    20 ---  1.0   1.0  1.1  1.1   1.1 ---   10  RIGHT
                                                          STREET NAME:
THRU   260 ---> 2.1  (NO. OF LANES)   2.1<---  760  THRU  Wilbur

RIGHT   50 ---  1.1   1.1  1.1  1.0   1.0 ---   30  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 150    5   20                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Minaker
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      20          0 *     1650     0.0000
    THRU (T)        5          5       1650     0.0030
    LEFT (L)      150        150       1650     0.0909     0.0909
    T + L                    155       1650     0.0939
------------------------------------------------------------------------
SB  RIGHT (R)      20          0 *     1650     0.0000
    THRU (T)        5          5       1650     0.0030
    LEFT (L)       10         10       1650     0.0061
    T + L                     15       1650     0.0091     0.0091
------------------------------------------------------------------------
EB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)      260        260       3300     0.0788
    LEFT (L)       20         20       1650     0.0121     0.0121
    T + R                    310       3300     0.0939
------------------------------------------------------------------------
WB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      760        760       3300     0.2303
    LEFT (L)       30         30       1650     0.0182
    T + R                    770       3300     0.2333     0.2333
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.35
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project WITH RAMPS                           10/24/06
========================================================================
INTERSECTION     6 Hillcrest/18th St                 Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            60   90   50
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    20 ---  1.0   1.0  1.0  1.0   1.1 ---   50  RIGHT
                                                          STREET NAME:
THRU   300 ---> 2.1  (NO. OF LANES)   2.1<---  450  THRU  18th St

RIGHT   90 ---  1.1   1.0  1.0  1.0   1.0 ---  210  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 230  100  220                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Hillcrest
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     220         10 *     1650     0.0061
    THRU (T)      100        100       1650     0.0606
    LEFT (L)      230        230       1650     0.1394     0.1394
------------------------------------------------------------------------
SB  RIGHT (R)      60         40 *     1650     0.0242
    THRU (T)       90         90       1650     0.0545     0.0545
    LEFT (L)       50         50       1650     0.0303
------------------------------------------------------------------------
EB  RIGHT (R)      90         90       1650     0.0545
    THRU (T)      300        300       3300     0.0909
    LEFT (L)       20         20       1650     0.0121
    T + R                    390       3300     0.1182     0.1182
------------------------------------------------------------------------
WB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)      450        450       3300     0.1364
    LEFT (L)      210        210       1650     0.1273     0.1273
    T + R                    500       3300     0.1515
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.44
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project WITH RAMPS                           10/24/06
========================================================================
INTERSECTION     7 Viera/18th St                     Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       2-PHASE SIGNAL
-----------            80   20   30
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   110 ---  1.0   1.1  1.1  1.1   1.1 ---  180  RIGHT
                                                          STREET NAME:
THRU   320 ---> 2.0  (NO. OF LANES)   2.1<---  490  THRU  18th St

RIGHT   60 ---  1.0   1.1  1.1  1.0   1.0 ---   20  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 150   30   40                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Viera
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      40         20 *     1800     0.0111
    THRU (T)       30         30       1800     0.0167
    LEFT (L)      150        150       1800     0.0833     0.0833
    T + L                    180       1800     0.1000
------------------------------------------------------------------------
SB  RIGHT (R)      80         80       1800     0.0444
    THRU (T)       20         20       1800     0.0111
    LEFT (L)       30         30       1800     0.0167
    T + R                    100       1800     0.0556
    T + L                     50       1800     0.0278
    T + R + L                130       1800     0.0722     0.0722
------------------------------------------------------------------------
EB  RIGHT (R)      60          0 *     1800     0.0000
    THRU (T)      320        320       3600     0.0889
    LEFT (L)      110        110       1800     0.0611     0.0611
------------------------------------------------------------------------
WB  RIGHT (R)     180        180       1800     0.1000
    THRU (T)      490        490       3600     0.1361
    LEFT (L)       20         20       1800     0.0111
    T + R                    670       3600     0.1861     0.1861
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.40
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project WITH RAMPS                           10/24/06
========================================================================
INTERSECTION     8 Phillips Lane/18th Street         Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            50   10   40
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    80 ---  1.0   1.1  1.1  2.0   1.0 ---   70  RIGHT
                                                          STREET NAME:
THRU   320 ---> 2.1  (NO. OF LANES)   2.0<---  640  THRU  18th Street

RIGHT   10 ---  1.1   1.0  1.1  1.1   1.0 ---   20  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  20   10   20                         Urb=N, Rur=N
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Phillips Lane
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)       10         10       1650     0.0061
    LEFT (L)       20         20       1650     0.0121     0.0121
    T + R                     30       1650     0.0182
------------------------------------------------------------------------
SB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)       10         10       1650     0.0061
    LEFT (L)       40         40       3000     0.0133
    T + R                     60       1650     0.0364     0.0364
------------------------------------------------------------------------
EB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      320        320       3300     0.0970
    LEFT (L)       80         80       1650     0.0485     0.0485
    T + R                    330       3300     0.1000
------------------------------------------------------------------------
WB  RIGHT (R)      70         48 *     1650     0.0291
    THRU (T)      640        640       3300     0.1939     0.1939
    LEFT (L)       20         20       1650     0.0121
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.29
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project WITH RAMPS                           10/24/06
========================================================================
INTERSECTION     9 SR 160 SB Ramp/Main Street        Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            30   20   40
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    10 ---  1.0   1.1  1.1  1.0   1.0 ---   90  RIGHT
                                                          STREET NAME:
THRU   310 ---> 2.1  (NO. OF LANES)   2.0<---  590  THRU  Main Street

RIGHT   50 ---  1.1   1.1  1.1  1.9   2.0 ---  960  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 120   10  140                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 SB Ramp
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     140        140       1650     0.0848
    THRU (T)       10         10       1650     0.0061
    LEFT (L)      120        120       1650     0.0727     0.0727
    T + L                    130       1650     0.0788
------------------------------------------------------------------------
SB  RIGHT (R)      30         30       1650     0.0182
    THRU (T)       20         20       1650     0.0121
    LEFT (L)       40         40       1650     0.0242
    T + R                     50       1650     0.0303     0.0303
------------------------------------------------------------------------
EB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)      310        310       3300     0.0939
    LEFT (L)       10         10       1650     0.0061
    T + R                    360       3300     0.1091     0.1091
------------------------------------------------------------------------
WB  RIGHT (R)      90         50 *     1650     0.0303
    THRU (T)      590        590       3300     0.1788
    LEFT (L)      960        960       3000     0.3200     0.3200
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.53
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project WITH RAMPS                           10/24/06
========================================================================
INTERSECTION    10 SR 160 NB Ramp/Main Street        Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0    0    0
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  RIGHT
                                                          STREET NAME:
THRU   410 ---> 3.1  (NO. OF LANES)   3.0<--- 1460  THRU  Main Street

RIGHT   80 ---  1.1   1.0  0.0  2.5   1.0 ---  100  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 180    0 1110                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 NB Ramp
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)    1110        928 *     3127     0.2968     0.2968
    LEFT (L)      180        180       1720     0.1047
------------------------------------------------------------------------
EB  RIGHT (R)      80         80       1720     0.0465
    THRU (T)      410        410       5160     0.0795
    T + R                    490       5160     0.0950
------------------------------------------------------------------------
WB  THRU (T)     1460       1460       5160     0.2829     0.2829
    LEFT (L)      100        100       1720     0.0581
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.58
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project WITH RAMPS                           10/24/06
========================================================================
INTERSECTION    11 Neroly/Main Street                Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------            80  110  100
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   180 ---  1.0   1.0  1.0  2.0   1.0 ---  350  RIGHT
                                                          STREET NAME:
THRU  1120 ---> 3.1  (NO. OF LANES)   3.0<--- 1220  THRU  Main Street

RIGHT  220 ---  1.1   2.0  1.1  1.1   1.0 ---   50  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 260  110   40                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Neroly
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      40         40       1650     0.0242
    THRU (T)      110        110       1650     0.0667
    LEFT (L)      260        260       3000     0.0867
    T + R                    150       1650     0.0909     0.0909
------------------------------------------------------------------------
SB  RIGHT (R)      80          0 *     1650     0.0000
    THRU (T)      110        110       1650     0.0667     0.0667
    LEFT (L)      100        100       3000     0.0333
------------------------------------------------------------------------
EB  RIGHT (R)     220        220       1650     0.1333
    THRU (T)     1120       1120       4950     0.2263
    LEFT (L)      180        180       1650     0.1091     0.1091
    T + R                   1340       4950     0.2707
------------------------------------------------------------------------
WB  RIGHT (R)     350        295 *     1650     0.1788
    THRU (T)     1220       1220       4950     0.2465     0.2465
    LEFT (L)       50         50       1650     0.0303
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.51
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project WITH RAMPS                           10/24/06
========================================================================
INTERSECTION    12 Sandy/Main Street                 Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0    0    0
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  RIGHT
                                                          STREET NAME:
THRU  1200 ---> 3.1  (NO. OF LANES)   3.0<--- 1600  THRU  Main Street

RIGHT   60 ---  1.1   1.0  0.0  1.0   1.0 ---   50  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  20    0   50                         Urb=N, Rur=N
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Sandy
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      50          0 *     1720     0.0000
    LEFT (L)       20         20       1720     0.0116     0.0116
------------------------------------------------------------------------
EB  RIGHT (R)      60         60       1720     0.0349
    THRU (T)     1200       1200       5160     0.2326
    T + R                   1260       5160     0.2442
------------------------------------------------------------------------
WB  THRU (T)     1600       1600       5160     0.3101     0.3101
    LEFT (L)       50         50       1720     0.0291
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.32
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project WITH RAMPS                           10/24/06
========================================================================
INTERSECTION    13 Live Oak/Main Street              Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            20   40   80
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   170 ---  1.0   1.1  2.1  2.0   1.1 ---  250  RIGHT
                                                          STREET NAME:
THRU   960 ---> 3.0  (NO. OF LANES)   3.1<--- 1500  THRU  Main Street

RIGHT  120 ---  1.0   1.0  2.1  1.1   1.0 ---   50  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 130  230   50                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)      230        230       3300     0.0697
    LEFT (L)      130        130       1650     0.0788
    T + R                    280       3300     0.0848     0.0848
------------------------------------------------------------------------
SB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)       40         40       3300     0.0121
    LEFT (L)       80         80       3000     0.0267     0.0267
    T + R                     60       3300     0.0182
------------------------------------------------------------------------
EB  RIGHT (R)     120          0 *     1650     0.0000
    THRU (T)      960        960       4950     0.1939
    LEFT (L)      170        170       1650     0.1030     0.1030
------------------------------------------------------------------------
WB  RIGHT (R)     250        250       1650     0.1515
    THRU (T)     1500       1500       4950     0.3030
    LEFT (L)       50         50       1650     0.0303
    T + R                   1750       4950     0.3535     0.3535
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.57
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project WITH RAMPS                           10/24/06
========================================================================
INTERSECTION    14 Big Break/Main Street             Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------           170   40  100
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   190 ---  1.0   1.0  1.1  1.1   1.0 ---   80  RIGHT
                                                          STREET NAME:
THRU   840 ---> 2.0  (NO. OF LANES)   2.0<--- 1560  THRU  Main Street

RIGHT   60 ---  1.0   1.0  1.1  1.1   1.0 ---   60  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  90   20   20                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Big Break
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)       20         20       1650     0.0121
    LEFT (L)       90         90       1650     0.0545     0.0545
    T + R                     40       1650     0.0242
------------------------------------------------------------------------
SB  RIGHT (R)     170          0 *     1650     0.0000
    THRU (T)       40         40       1650     0.0242
    LEFT (L)      100        100       1650     0.0606
    T + L                    140       1650     0.0848     0.0848
------------------------------------------------------------------------
EB  RIGHT (R)      60          0 *     1650     0.0000
    THRU (T)      840        840       3300     0.2545
    LEFT (L)      190        190       1650     0.1152     0.1152
------------------------------------------------------------------------
WB  RIGHT (R)      80          0 *     1650     0.0000
    THRU (T)     1560       1560       3300     0.4727     0.4727
    LEFT (L)       60         60       1650     0.0364
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.73
     INTERSECTION LEVEL OF SERVICE:                             C
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project WITH RAMPS                           10/24/06
========================================================================
INTERSECTION    17 Empire Ave/Oakley Road            Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------           110  290   50
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? Y
LEFT   140 ---  2.1   1.0  1.0  1.0   1.0 ---   20  RIGHT
                                                          STREET NAME:
THRU    10 ---> 1.1  (NO. OF LANES)   1.1<---   10  THRU  Oakley Road

RIGHT  190 ---  1.0   1.0  2.1  1.1   1.1 ---   20  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 380  550   20                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire Ave
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)      550        550       3300     0.1667
    LEFT (L)      380        380       1650     0.2303     0.2303
    T + R                    570       3300     0.1727
------------------------------------------------------------------------
SB  RIGHT (R)     110         33 *     1650     0.0200
    THRU (T)      290        290       1650     0.1758     0.1758
    LEFT (L)       50         50       1650     0.0303
------------------------------------------------------------------------
EB  RIGHT (R)     190          0 *     1650     0.0000
    THRU (T)       10         10       1650     0.0061
    LEFT (L)      140        140       3000     0.0467
    T + L                    150       3000     0.0500     0.0500
------------------------------------------------------------------------
WB  RIGHT (R)      20          0 *     1650     0.0000
    THRU (T)       10         10       1650     0.0061
    LEFT (L)       20         20       1650     0.0121
    T + L                     30       1650     0.0182     0.0182
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.47
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project WITH RAMPS                           10/24/06
========================================================================
INTERSECTION    18 Empire Avenue/Main Street         Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------            50   40   20
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    20 ---  1.0   1.0  1.1  1.1   1.1 ---   20  RIGHT
                                                          STREET NAME:
THRU   710 ---> 2.0  (NO. OF LANES)   2.1<--- 1210  THRU  Main Street

RIGHT  200 ---  1.0   2.0  1.0  1.0   1.0 ---  210  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 490   20  200                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Empire Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     200          0 *     1650     0.0000
    THRU (T)       20         20       1650     0.0121
    LEFT (L)      490        490       3000     0.1633     0.1633
------------------------------------------------------------------------
SB  RIGHT (R)      50         30 *     1650     0.0182
    THRU (T)       40         40       1650     0.0242
    LEFT (L)       20         20       1650     0.0121
    T + L                     60       1650     0.0364     0.0364
------------------------------------------------------------------------
EB  RIGHT (R)     200          0 *     1650     0.0000
    THRU (T)      710        710       3300     0.2152
    LEFT (L)       20         20       1650     0.0121     0.0121
------------------------------------------------------------------------
WB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)     1210       1210       3300     0.3667
    LEFT (L)      210        210       1650     0.1273
    T + R                   1230       3300     0.3727     0.3727
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.58
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project WITH RAMPS                           10/24/06
========================================================================
INTERSECTION    19 Vintage/Main Street               Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------            30    0   60
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    90 ---  1.0   1.0  0.0  1.0   1.1 ---   40  RIGHT
                                                          STREET NAME:
THRU   410 ---> 2.0  (NO. OF LANES)   2.1<---  480  THRU  Main Street

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=N, Rur=N
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Vintage
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)      30          0 *     1720     0.0000
    LEFT (L)       60         60       1720     0.0349    0.0349
------------------------------------------------------------------------
EB  THRU (T)      410        410       3440     0.1192
    LEFT (L)       90         90       1720     0.0523    0.0523
------------------------------------------------------------------------
WB  RIGHT (R)      40         40       1720     0.0233
    THRU (T)      480        480       3440     0.1395
    T + R                    520       3440     0.1512    0.1512
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.24
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project WITH RAMPS                           10/24/06
========================================================================
INTERSECTION    20 O'Hara Avenue/Main Street         Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            10   90   20
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    10 ---  1.0   1.1  1.1  1.1   1.1 ---   20  RIGHT
                                                          STREET NAME:
THRU   420 ---> 1.0  (NO. OF LANES)   1.1<---  450  THRU  Main Street

RIGHT   80 ---  1.0   1.0  1.1  1.1   1.0 ---   40  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 110   40   60                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: O'Hara Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      60         60       1650     0.0364
    THRU (T)       40         40       1650     0.0242
    LEFT (L)      110        110       1650     0.0667    0.0667
    T + R                    100       1650     0.0606
------------------------------------------------------------------------
SB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)       90         90       1650     0.0545
    LEFT (L)       20         20       1650     0.0121
    T + R                    100       1650     0.0606
    T + L                    110       1650     0.0667
    T + R + L                120       1650     0.0727    0.0727
------------------------------------------------------------------------
EB  RIGHT (R)      80          0 *     1650     0.0000
    THRU (T)      420        420       1650     0.2545
    LEFT (L)       10         10       1650     0.0061    0.0061
------------------------------------------------------------------------
WB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)      450        450       1650     0.2727
    LEFT (L)       40         40       1650     0.0242
    T + R                    470       1650     0.2848    0.2848
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.43
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project WITH RAMPS                           10/24/06
========================================================================
INTERSECTION    21 Empire Avenue/Cypress Road        Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0  430  120
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  2.0  1.0   1.0 ---  220  RIGHT
                                                          STREET NAME:
THRU     0 ---> 0.0  (NO. OF LANES)   0.0<---    0  THRU  Cypress Road

RIGHT    0 ---  0.0   0.0  2.1  1.1   1.0 ---  210  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0  780  120                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     120        120       1720     0.0698
    THRU (T)      780        780       3440     0.2267
    T + R                    900       3440     0.2616    0.2616
------------------------------------------------------------------------
SB  THRU (T)      430        430       3440     0.1250
    LEFT (L)      120        120       1720     0.0698    0.0698
------------------------------------------------------------------------
WB  RIGHT (R)     220        100 *     1720     0.0581
    LEFT (L)      210        210       1720     0.1221    0.1221
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.45
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project WITH RAMPS                           10/24/06
========================================================================
INTERSECTION    22 Main Street/Cypress                Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            10  450  410
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    40 ---  1.0   1.1  2.1  2.0   2.6 --- 1070  RIGHT
                                                          STREET NAME:
THRU   180 ---> 2.1  (NO. OF LANES)   1.1<---  280  THRU  Cypress

RIGHT   50 ---  1.1   1.0  2.0  1.5   1.0 ---  380  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  90  520  220                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Main Street
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     220          0 *     1650     0.0000
    THRU (T)      520        520       3300     0.1576    0.1576
    LEFT (L)       90         90       1650     0.0545
------------------------------------------------------------------------
SB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      450        450       3300     0.1364
    LEFT (L)      410        410       3000     0.1367    0.1367
    T + R                    460       3300     0.1394
------------------------------------------------------------------------
EB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)      180        180       3300     0.0545
    LEFT (L)       40         40       1650     0.0242    0.0242
    T + R                    230       3300     0.0697
------------------------------------------------------------------------
WB  RIGHT (R)    1070        845 *     3000     0.2817
    THRU (T)      280        280       1650     0.1697
    LEFT (L)      380        380       1650     0.2303
    T + R                   1125       3000     0.3750    0.3750
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.69
     INTERSECTION LEVEL OF SERVICE:                             B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project WITH RAMPS                           10/24/06
========================================================================
INTERSECTION    24 Live Oak/Laurel                   Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------           310    0   60
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   290 ---  2.0   1.0  0.0  1.0   1.1 ---  120  RIGHT
                                                          STREET NAME:
THRU  1020 ---> 3.0  (NO. OF LANES)   3.1<--- 1830  THRU  Laurel

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)     310        150 *     1720     0.0872     0.0872
    LEFT (L)       60         60       1720     0.0349
------------------------------------------------------------------------
EB  THRU (T)     1020       1020       5160     0.1977
    LEFT (L)      290        290       3127     0.0927     0.0927
------------------------------------------------------------------------
WB  RIGHT (R)     120        120       1720     0.0698
    THRU (T)     1830       1830       5160     0.3547
    T + R                   1950       5160     0.3779     0.3779
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.56
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project WITH RAMPS                           10/24/06
========================================================================
INTERSECTION    25 Empire/Laurel                     Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------           420  220   50
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   220 ---  1.0   1.1  2.1  1.0   1.1 ---  260  RIGHT
                                                          STREET NAME:
THRU   710 ---> 2.1  (NO. OF LANES)   2.1<--- 1350  THRU  Laurel

RIGHT  150 ---  1.1   1.0  2.1  1.1   1.0 ---   60  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 180  450   50                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)      450        450       3300     0.1364
    LEFT (L)      180        180       1650     0.1091     0.1091
    T + R                    500       3300     0.1515
------------------------------------------------------------------------
SB  RIGHT (R)     420        420       1650     0.2545     0.2545
    THRU (T)      220        220       3300     0.0667
    LEFT (L)       50         50       1650     0.0303
    T + R                    640       3300     0.1939
------------------------------------------------------------------------
EB  RIGHT (R)     150        150       1650     0.0909
    THRU (T)      710        710       3300     0.2152
    LEFT (L)      220        220       1650     0.1333     0.1333
    T + R                    860       3300     0.2606
------------------------------------------------------------------------
WB  RIGHT (R)     260        260       1650     0.1576
    THRU (T)     1350       1350       3300     0.4091
    LEFT (L)       60         60       1650     0.0364
    T + R                   1610       3300     0.4879     0.4879
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.98
     INTERSECTION LEVEL OF SERVICE:                             E
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

Cumulative (2030) No Project AM

HCM Signalized Intersection Capacity Analysis
1: Wilbur Avenue & Minaker Drive

2010 PM with Ramps
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↰	↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	0.97		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (prot)	1770	3435		1770	3526			1770	1583		1817	1583
Flt Permitted	0.95	1.00		0.95	1.00			0.74	1.00		0.86	1.00
Satd. Flow (perm)	1770	3435		1770	3526			1384	1583		1605	1583
Volume (vph)	10	780	190	50	420	10	70	0	60	10	10	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	821	200	53	442	11	74	0	63	11	11	21
RTOR Reduction (vph)	0	24	0	0	2	0	0	0	54	0	0	18
Lane Group Flow (vph)	11	997	0	53	451	0	0	74	9	0	22	3
Turn Type	Prot			Prot			Perm		Perm	Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		4
Actuated Green, G (s)	0.9	39.8		2.8	41.7			9.1	9.1		9.1	9.1
Effective Green, g (s)	0.9	39.8		2.8	41.7			9.1	9.1		9.1	9.1
Actuated g/C Ratio	0.01	0.62		0.04	0.65			0.14	0.14		0.14	0.14
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	25	2146		78	2308			198	226		229	226
v/s Ratio Prot	0.01	c0.29		c0.03	0.13							
v/s Ratio Perm								c0.05	0.01		0.01	0.00
v/c Ratio	0.44	0.46		0.68	0.20			0.37	0.04		0.10	0.01
Uniform Delay, d1	31.2	6.3		30.0	4.4			24.7	23.5		23.7	23.4
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	11.9	0.2		21.0	0.0			1.2	0.1		0.2	0.0
Delay (s)	43.0	6.5		51.0	4.4			25.9	23.6		23.9	23.5
Level of Service	D	A		D	A			C	C		C	C
Approach Delay (s)		6.9			9.3			24.8			23.7	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	9.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	63.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
2: Wilbur Avenue & Viera Avenue

2010 PM with Ramps
11/6/2006

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱		↰	↑	↰↱	
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	740	130	30	450	50	30
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	779	137	32	474	53	32
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			916		1384	847
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			916		1384	847
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		65	91
cM capacity (veh/h)			745		151	362

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	916	32	474	84
Volume Left	0	32	0	53
Volume Right	137	0	0	32
cSH	1700	745	1700	194
Volume to Capacity	0.54	0.04	0.28	0.43
Queue Length 95th (ft)	0	3	0	50
Control Delay (s)	0.0	10.0	0.0	37.2
Lane LOS		B		E
Approach Delay (s)	0.0	0.6		37.2
Approach LOS				E

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	58.1%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
3: Wilbur Avenue & SR 160 SB Off

2010 PM with Ramps
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱		↰	↑↑					↰		↱
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	590	190	160	400	0	0	0	0	200	0	90
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	621	200	168	421	0	0	0	0	211	0	95
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	421			821			1268	1479	721	1479	1579	211
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	421			821			1268	1479	721	1479	1579	211
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			79			100	100	100	0	100	88
cM capacity (veh/h)	1135			804			93	99	370	73	86	795

Direction, Lane #	EB 1	WB 1	WB 2	WB 3	SB 1	SB 2
Volume Total	821	168	211	211	211	95
Volume Left	0	168	0	0	211	0
Volume Right	200	0	0	0	0	95
cSH	1700	804	1700	1700	73	795
Volume to Capacity	0.48	0.21	0.12	0.12	2.87	0.12
Queue Length 95th (ft)	0	20	0	0	523	10
Control Delay (s)	0.0	10.7	0.0	0.0	966.7	10.1
Lane LOS		B			F	B
Approach Delay (s)	0.0	3.0			669.8	
Approach LOS					F	

Intersection Summary			
Average Delay	120.2		
Intersection Capacity Utilization	72.6%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
4: Wilbur Avenue & SR 160 NB On

2010 PM with Ramps
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑			↑↱		↰		↱			
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	330	460	0	0	510	40	50	0	120	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	347	484	0	0	537	42	53	0	126	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	579			484			1447	1758	242	1495	1737	289
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	579			484			1447	1758	242	1495	1737	289
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	65			100			22	100	83	100	100	100
cM capacity (veh/h)	991			1075			67	54	759	52	56	707

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2
Volume Total	347	242	242	358	221	53	126
Volume Left	347	0	0	0	0	53	0
Volume Right	0	0	0	0	42	0	126
cSH	991	1700	1700	1700	1700	67	759
Volume to Capacity	0.35	0.14	0.14	0.21	0.13	0.78	0.17
Queue Length 95th (ft)	40	0	0	0	0	91	15
Control Delay (s)	10.6	0.0	0.0	0.0	0.0	156.0	10.7
Lane LOS	B					F	B
Approach Delay (s)	4.4			0.0		53.4	
Approach LOS						F	

Intersection Summary			
Average Delay	8.3		
Intersection Capacity Utilization	72.6%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
5: Wilbur Avenue & Bridgehead Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	30	370	180	30	400	10	100	50	50	10	30	50
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	389	189	32	421	11	105	53	53	11	32	53

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1
Volume Total (vph)	32	579	463	211	95
Volume Left (vph)	32	0	32	105	11
Volume Right (vph)	0	189	11	53	53
Hadj (s)	0.53	-0.20	0.03	-0.02	-0.28
Departure Headway (s)	7.0	6.3	6.4	7.3	7.6
Degree Utilization, x	0.06	1.01	0.82	0.43	0.20
Capacity (veh/h)	510	579	565	467	438
Control Delay (s)	9.3	63.4	31.8	15.6	12.5
Approach Delay (s)	60.6		31.8	15.6	12.5
Approach LOS	F		D	C	B

Intersection Summary			
Delay	40.8		
HCM Level of Service	E		
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
6: E 18th Street & Hillcrest Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑	↱	↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3436		1770	3501		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3436		1770	3501		1770	1863	1583	1770	1863	1583
Volume (vph)	70	950	230	260	510	40	190	210	280	80	140	40
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	1000	242	274	537	42	200	221	295	84	147	42
RTOR Reduction (vph)	0	20	0	0	5	0	0	0	148	0	0	36
Lane Group Flow (vph)	74	1222	0	274	574	0	200	221	147	84	147	6
Turn Type	Prot			Prot			Split		Perm	Split		Perm
Protected Phases	1	6		5	2		8	8		4	4	
Permitted Phases									8			4
Actuated Green, G (s)	6.1	32.1		13.1	39.1		15.2	15.2	15.2	12.3	12.3	12.3
Effective Green, g (s)	7.1	34.1		14.1	41.1		16.7	16.7	16.7	13.8	13.8	13.8
Actuated g/C Ratio	0.08	0.38		0.16	0.45		0.18	0.18	0.18	0.15	0.15	0.15
Clearance Time (s)	4.0	5.0		4.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	139	1292		275	1586		326	343	291	269	283	241
v/s Ratio Prot	0.04	c0.36		c0.15	0.16		0.11	c0.12		0.05	c0.08	
v/s Ratio Perm									0.09			0.00
v/c Ratio	0.53	0.95		1.00	0.36		0.61	0.64	0.51	0.31	0.52	0.03
Uniform Delay, d1	40.2	27.4		38.3	16.2		34.0	34.3	33.3	34.2	35.4	32.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.9	14.0		52.9	0.1		3.4	4.1	1.4	0.7	1.6	0.0
Delay (s)	44.1	41.4		91.2	16.4		37.4	38.4	34.7	34.9	37.0	32.8
Level of Service	D	D		F	B		D	D	C	C	D	C
Approach Delay (s)		41.5			40.4			36.6			35.7	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	39.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	90.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
7: E 18th Street & Viera Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↱			↰↑	↱		✥	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	0.98			1.00	0.85		0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00		0.99	
Satd. Flow (prot)	1770	3539	1583	1770	3478			1788	1583		1717	
Flt Permitted	0.34	1.00	1.00	0.22	1.00			0.58	1.00		0.90	
Satd. Flow (perm)	636	3539	1583	404	3478			1083	1583		1564	
Volume (vph)	120	980	190	30	610	80	100	20	20	70	80	150
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	126	1032	200	32	642	84	105	21	21	74	84	158
RTOR Reduction (vph)	0	0	88	0	15	0	0	0	15	0	67	0
Lane Group Flow (vph)	126	1032	112	32	711	0	0	126	6	0	249	0
Turn Type	Perm		Perm	Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	23.3	23.3	23.3	23.3	23.3			11.7	11.7		11.7	
Effective Green, g (s)	25.3	25.3	25.3	25.3	25.3			13.7	13.7		13.7	
Actuated g/C Ratio	0.56	0.56	0.56	0.56	0.56			0.30	0.30		0.30	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	358	1990	890	227	1955			330	482		476	
v/s Ratio Prot		c0.29			0.20							
v/s Ratio Perm	0.20		0.07	0.08				0.12	0.00		c0.16	
v/c Ratio	0.35	0.52	0.13	0.14	0.36			0.38	0.01		0.52	
Uniform Delay, d1	5.4	6.1	4.6	4.7	5.4			12.3	10.9		12.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.6	0.2	0.1	0.3	0.1			0.7	0.0		1.0	
Delay (s)	6.0	6.3	4.7	5.0	5.5			13.1	10.9		14.0	
Level of Service	A	A	A	A	A			B	B		B	
Approach Delay (s)		6.0			5.5			12.8			14.0	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	7.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: E 18th Street & Phillips Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱	↰	↱		↰↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.97	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.88		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3526		1770	3539	1583	1770	1631		3433	1592	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3526		1770	3539	1583	1770	1631		3433	1592	
Volume (vph)	280	780	20	20	410	230	20	10	50	250	10	310
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	295	821	21	21	432	242	21	11	53	263	11	326
RTOR Reduction (vph)	0	2	0	0	0	180	0	44	0	0	242	0
Lane Group Flow (vph)	295	840	0	21	432	62	21	20	0	263	95	0
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	5	2		1	6		4	7		8	3	
Permitted Phases						6						
Actuated Green, G (s)	13.3	28.6		0.6	15.9	15.9	1.0	11.0		6.1	16.1	
Effective Green, g (s)	13.3	28.6		0.6	15.9	15.9	1.0	11.0		6.1	16.1	
Actuated g/C Ratio	0.21	0.46		0.01	0.26	0.26	0.02	0.18		0.10	0.26	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	378	1619		17	903	404	28	288		336	411	
v/s Ratio Prot	c0.17	c0.24		0.01	0.12		0.01	0.01		c0.08	c0.06	
v/s Ratio Perm						0.04						
v/c Ratio	0.78	0.52		1.24	0.48	0.15	0.75	0.07		0.78	0.23	
Uniform Delay, d1	23.1	12.0		30.8	19.7	18.0	30.5	21.4		27.5	18.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.0	0.3		301.3	0.4	0.2	71.8	0.1		11.3	0.3	
Delay (s)	33.1	12.2		332.1	20.1	18.2	102.3	21.5		38.7	18.5	
Level of Service	C	B		F	C	B	F	C		D	B	
Approach Delay (s)		17.7			28.8			41.5			27.4	
Approach LOS		B			C			D			C	

Intersection Summary			
HCM Average Control Delay	23.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	62.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

9: E 18th Street & SR 160 SB Off

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰↰	↑↑	↱		↰↑	↱	↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85		1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1719	3360		3335	3438	1538		1751	1538	1719	1702	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.77	1.00	0.72	1.00	
Satd. Flow (perm)	1719	3360		3335	3438	1538		1402	1538	1296	1702	
Volume (vph)	30	900	160	920	560	100	40	20	140	90	30	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	947	168	968	589	105	42	21	147	95	32	21
RTOR Reduction (vph)	0	10	0	0	0	25	0	0	0	0	19	0
Lane Group Flow (vph)	32	1105	0	968	589	80	0	63	147	95	34	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot		Perm	Perm		Free	Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases						6	8		Free	4		
Actuated Green, G (s)	3.6	55.3		38.9	90.6	90.6		12.8	120.0	12.8	12.8	
Effective Green, g (s)	3.6	56.3		38.9	91.6	91.6		12.8	120.0	12.8	12.8	
Actuated g/C Ratio	0.03	0.47		0.32	0.76	0.76		0.11	1.00	0.11	0.11	
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0		4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	4.0	4.0		2.0		2.0	2.0	
Lane Grp Cap (vph)	52	1576		1081	2624	1174		150	1538	138	182	
v/s Ratio Prot	0.02	c0.33		c0.29	0.17						0.02	
v/s Ratio Perm						0.05		0.04	0.10	c0.07		
v/c Ratio	0.62	0.70		0.90	0.22	0.07		0.42	0.10	0.69	0.19	
Uniform Delay, d1	57.5	25.2		38.6	4.1	3.5		50.1	0.0	51.7	48.9	
Progression Factor	1.00	1.00		0.81	1.61	3.28		1.00	1.00	1.00	1.00	
Incremental Delay, d2	19.7	2.6		9.1	0.2	0.1		0.7	0.1	10.8	0.2	
Delay (s)	77.2	27.8		40.5	6.7	11.7		50.8	0.1	62.5	49.0	
Level of Service	E	C		D	A	B		D	A	E	D	
Approach Delay (s)		29.2			26.7			15.3			57.7	
Approach LOS		C			C			B			E	

Intersection Summary			
HCM Average Control Delay	28.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

10: Main Street & SR 160 NB On

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑↱		↰	↑↑↑	↰	↱↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		1.00	0.91	1.00	0.88
Frt	0.98		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	4848		1719	4940	1719	2707
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	4848		1719	4940	1719	2707
Volume (vph)	990	140	200	1390	190	1460
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1042	147	211	1463	200	1537
RTOR Reduction (vph)	15	0	0	0	0	10
Lane Group Flow (vph)	1174	0	211	1463	200	1527
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Turn Type			Prot			pm+ov
Protected Phases	2		1	6	8	1
Permitted Phases						8
Actuated Green, G (s)	38.6		53.0	95.6	15.4	68.4
Effective Green, g (s)	39.6		53.0	96.6	15.4	68.4
Actuated g/C Ratio	0.33		0.44	0.80	0.13	0.57
Clearance Time (s)	5.0		4.0	5.0	4.0	4.0
Vehicle Extension (s)	4.0		3.0	4.0	2.0	3.0
Lane Grp Cap (vph)	1600		759	3977	221	1633
v/s Ratio Prot	c0.24		0.12	0.30	0.12	c0.41
v/s Ratio Perm						0.15
v/c Ratio	0.73		0.28	0.37	0.90	0.93
Uniform Delay, d1	35.5		21.3	3.2	51.6	23.8
Progression Factor	0.48		0.95	0.35	1.00	1.00
Incremental Delay, d2	2.5		0.2	0.2	35.0	10.4
Delay (s)	19.6		20.3	1.4	86.6	34.1
Level of Service	B		C	A	F	C
Approach Delay (s)	19.6			3.8	40.2	
Approach LOS	B			A	D	

Intersection Summary			
HCM Average Control Delay	21.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	80.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

11: Main Street & Bridgehead Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑↱		↰	↑↑↑	↱	↰↰	↑↱		↰↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00	0.97	1.00		0.97	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	4808		1719	4940	1538	3335	1689		3335	1810	1538
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1719	4808		1719	4940	1538	3335	1689		3335	1810	1538
Volume (vph)	90	1940	420	80	1270	150	210	100	80	210	80	110
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	2042	442	84	1337	158	221	105	84	221	84	116
RTOR Reduction (vph)	0	26	0	0	0	71	0	25	0	0	0	104
Lane Group Flow (vph)	95	2458	0	84	1337	87	221	164	0	221	84	12
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot		Perm	Split			Split		Perm
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases						6						7
Actuated Green, G (s)	11.4	70.1		6.0	64.7	64.7	14.5	14.5		12.4	12.4	12.4
Effective Green, g (s)	11.4	71.1		6.0	65.7	65.7	14.5	14.5		12.4	12.4	12.4
Actuated g/C Ratio	0.10	0.59		0.05	0.55	0.55	0.12	0.12		0.10	0.10	0.10
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	163	2849		86	2705	842	403	204		345	187	159
v/s Ratio Prot	0.06	c0.51		c0.05	0.27		0.07	c0.10		c0.07	0.05	
v/s Ratio Perm						0.06						0.01
v/c Ratio	0.58	0.86		0.98	0.49	0.10	0.55	0.81		0.64	0.45	0.08
Uniform Delay, d1	52.0	20.4		56.9	16.8	13.0	49.7	51.4		51.7	50.6	48.6
Progression Factor	1.01	0.76		1.14	0.48	0.46	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.7	1.9		85.9	0.6	0.2	0.8	19.2		3.0	0.6	0.1
Delay (s)	54.0	17.3		150.5	8.8	6.2	50.5	70.6		54.7	51.2	48.7
Level of Service	D	B		F	A	A	D	E		D	D	D
Approach Delay (s)		18.7			16.1			59.8			52.3	
Approach LOS		B			B			E			D	

Intersection Summary			
HCM Average Control Delay	24.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

12: Main Street & Sandy Lane

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑↱		↰	↑↑↑	↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		1.00	0.91	1.00	1.00
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	4870		1719	4940	1719	1538
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	4870		1719	4940	1719	1538
Volume (vph)	2020	210	40	1390	110	160
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	2126	221	42	1463	116	168
RTOR Reduction (vph)	7	0	0	0	0	146
Lane Group Flow (vph)	2340	0	42	1463	116	22
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Turn Type			Prot			custom
Protected Phases	2		1	6		
Permitted Phases					3	3
Actuated Green, G (s)	86.7		7.3	97.5	13.0	13.0
Effective Green, g (s)	87.2		7.3	98.5	13.5	13.5
Actuated g/C Ratio	0.73		0.06	0.82	0.11	0.11
Clearance Time (s)	4.5		4.0	5.0	4.5	4.5
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	3539		105	4055	193	173
v/s Ratio Prot	c0.48		0.02	c0.30		
v/s Ratio Perm					c0.07	0.01
v/c Ratio	0.66		0.40	0.36	0.60	0.12
Uniform Delay, d1	8.6		54.2	2.7	50.7	47.9
Progression Factor	0.23		1.43	0.36	1.00	1.00
Incremental Delay, d2	0.5		1.9	0.2	5.2	0.3
Delay (s)	2.5		79.4	1.2	55.9	48.3
Level of Service	A		E	A	E	D
Approach Delay (s)	2.5			3.4	51.4	
Approach LOS	A			A	D	

Intersection Summary			
HCM Average Control Delay	6.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2010 PM with Ramps

13: Main Street & Live Oak Ave

11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑	↱	↰	↑↑↱		↰	↑↱		↰↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91		1.00	0.95		0.97	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.87		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	4940	1538	1719	4851		1719	3019		3433	3398	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	4940	1538	1719	4851		1719	3019		3433	3398	
Volume (vph)	150	1810	220	90	1210	210	140	30	160	260	220	80
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	158	1905	232	95	1274	221	147	32	168	274	232	84
RTOR Reduction (vph)	0	0	97	0	19	0	0	158	0	0	32	0
Lane Group Flow (vph)	158	1905	135	95	1476	0	147	42	0	274	284	0
Heavy Vehicles (%)	2%	5%	5%	5%	5%	2%	5%	2%	5%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2									
Actuated Green, G (s)	19.0	63.7	63.7	11.0	55.7		14.7	7.3		22.0	14.6	
Effective Green, g (s)	19.0	63.7	63.7	11.0	55.7		14.7	7.3		22.0	14.6	
Actuated g/C Ratio	0.16	0.53	0.53	0.09	0.46		0.12	0.06		0.18	0.12	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	280	2622	816	158	2252		211	184		629	413	
v/s Ratio Prot	0.09	c0.39		0.06	c0.30		c0.09	0.01		0.08	c0.08	
v/s Ratio Perm			0.09									
v/c Ratio	0.56	0.73	0.17	0.60	0.66		0.70	0.23		0.44	0.69	
Uniform Delay, d1	46.7	21.5	14.5	52.4	24.8		50.5	53.7		43.5	50.5	
Progression Factor	0.66	0.39	0.24	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	1.4	0.3	6.3	1.5		9.6	0.6		0.5	4.7	
Delay (s)	32.9	9.8	3.9	58.7	26.3		60.1	54.3		44.0	55.3	
Level of Service	C	A	A	E	C		E	D		D	E	
Approach Delay (s)		10.8			28.2			56.8			50.0	
Approach LOS		B			C			E			D	

Intersection Summary			
HCM Average Control Delay	24.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2010 PM with Ramps

14: Main Street & Big Break Road

11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↱			↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.97	1.00
Satd. Flow (prot)	1770	3438	1583	1770	3438	1583	1770	1695			1800	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.53	1.00			0.50	1.00
Satd. Flow (perm)	1770	3438	1583	1770	3438	1583	979	1695			929	1583
Volume (vph)	270	1780	180	90	1160	80	120	60	90	90	40	230
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	284	1874	189	95	1221	84	126	63	95	95	42	242
RTOR Reduction (vph)	0	0	47	0	0	30	0	47	0	0	0	202
Lane Group Flow (vph)	284	1874	142	95	1221	54	126	111	0	0	137	40
Heavy Vehicles (%)	2%	5%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot		custom	Prot		custom	Perm			Perm		Perm
Protected Phases	5			1				3			7	
Permitted Phases		2	2		6	6	3			7		7
Actuated Green, G (s)	21.6	78.1	78.1	9.1	64.6	64.6	19.8	19.8			19.8	19.8
Effective Green, g (s)	22.6	79.1	79.1	9.1	65.6	65.6	19.8	19.8			19.8	19.8
Actuated g/C Ratio	0.19	0.66	0.66	0.08	0.55	0.55	0.17	0.17			0.17	0.17
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	333	2266	1043	134	1879	865	162	280			153	261
v/s Ratio Prot	c0.16			0.05				0.07				
v/s Ratio Perm		c0.55	0.09		0.36	0.03	0.13				c0.15	0.03
v/c Ratio	0.85	0.83	0.14	0.71	0.65	0.06	0.78	0.40			0.90	0.15
Uniform Delay, d1	47.1	15.3	7.7	54.2	19.1	12.8	48.0	44.8			49.1	42.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	18.0	3.6	0.3	13.1	1.8	0.1	20.6	0.9			43.3	0.3
Delay (s)	65.1	19.0	7.9	67.2	20.9	12.9	68.6	45.7			92.3	43.2
Level of Service	E	B	A	E	C	B	E	D			F	D
Approach Delay (s)		23.6			23.5			55.8			61.0	
Approach LOS		C			C			E			E	

Intersection Summary			
HCM Average Control Delay	28.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

2010 PM with Ramps

15: Oakley Road & Neroly Road

11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	30	160	140	20	90	100	60	210	20	170	330	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	168	147	21	95	105	63	221	21	179	347	21

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	347	221	305	547
Volume Left (vph)	32	21	63	179
Volume Right (vph)	147	105	21	21
Hadj (s)	-0.20	-0.23	0.03	0.08
Departure Headway (s)	7.3	7.8	7.6	7.1
Degree Utilization, x	0.71	0.48	0.64	1.08
Capacity (veh/h)	470	422	452	498
Control Delay (s)	26.3	17.7	23.1	90.9
Approach Delay (s)	26.3	17.7	23.1	90.9
Approach LOS	D	C	C	F

Intersection Summary			
Delay	49.2		
HCM Level of Service	E		
Intersection Capacity Utilization	76.4%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis

2010 PM with Ramps

16: Oakley Road & Live Oak Ave

11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	20	290	30	60	210	150	50	110	60	220	260	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	305	32	63	221	158	53	116	63	232	274	21

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	358	442	232	526
Volume Left (vph)	21	63	53	232
Volume Right (vph)	32	158	63	21
Hadj (s)	-0.01	-0.15	-0.08	0.10
Departure Headway (s)	8.4	8.0	9.0	8.4
Degree Utilization, x	0.84	0.98	0.58	1.23
Capacity (veh/h)	417	442	380	416
Control Delay (s)	42.2	66.6	23.8	146.8
Approach Delay (s)	42.2	66.6	23.8	146.8
Approach LOS	E	F	C	F

Intersection Summary			
Delay	81.7		
HCM Level of Service	F		
Intersection Capacity Utilization	90.5%	ICU Level of Service	E
Analysis Period (min)	15		

17: Oakley Road & Empire Avenue

11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↑	↱		↰↑	↱	↰	↑↑↱		↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95		1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1716	1583		1807	1583	1770	3512		1770	1863	1583
Flt Permitted	0.95	0.97	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1716	1583		1807	1583	1770	3512		1770	1863	1583
Volume (vph)	250	60	290	80	50	80	280	570	30	150	520	150
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	263	63	305	84	53	84	295	600	32	158	547	158
RTOR Reduction (vph)	0	0	264	0	0	73	0	4	0	0	0	102
Lane Group Flow (vph)	159	167	41	0	137	11	295	628	0	158	547	56
Turn Type	Split		Perm	Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8						6
Actuated Green, G (s)	10.4	10.4	10.4		9.2	9.2	12.6	30.2		9.2	26.8	26.8
Effective Green, g (s)	10.4	10.4	10.4		10.2	10.2	13.6	31.2		10.2	27.8	27.8
Actuated g/C Ratio	0.13	0.13	0.13		0.13	0.13	0.17	0.40		0.13	0.36	0.36
Clearance Time (s)	4.0	4.0	4.0		5.0	5.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	224	229	211		236	207	309	1405		231	664	564
v/s Ratio Prot	0.09	c0.10			c0.08		c0.17	c0.18		0.09	c0.29	
v/s Ratio Perm			0.03			0.01						0.04
v/c Ratio	0.71	0.73	0.19		0.58	0.05	0.95	0.45		0.68	0.82	0.10
Uniform Delay, d1	32.4	32.4	30.1		31.9	29.7	31.9	17.1		32.4	22.9	16.8
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	9.9	11.0	0.4		3.6	0.1	38.9	0.2		8.1	8.2	0.1
Delay (s)	42.2	43.5	30.5		35.5	29.8	70.8	17.3		40.5	31.0	16.8
Level of Service	D	D	C		D	C	E	B		D	C	B
Approach Delay (s)		36.9			33.3			34.3			30.2	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	33.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	78.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

18: Main Street & Empire Avenue

11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑↱		↰↰	↑	↱		↰↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.97	1.00
Satd. Flow (prot)	1719	3539	1538	1770	3528		3335	1810	1583		1787	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.97	1.00
Satd. Flow (perm)	1719	3539	1538	1770	3528		3335	1810	1583		1787	1538
Volume (vph)	40	1540	450	350	900	20	480	40	380	30	20	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	1621	474	368	947	21	505	42	400	32	21	32
RTOR Reduction (vph)	0	0	167	0	1	0	0	0	242	0	0	31
Lane Group Flow (vph)	42	1621	307	368	967	0	505	42	158	0	53	1
Heavy Vehicles (%)	5%	2%	5%	2%	2%	2%	5%	5%	2%	2%	5%	5%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	5.6	59.1	59.1	26.0	79.5		22.3	22.3	22.3		4.0	4.0
Effective Green, g (s)	6.6	60.1	60.1	27.0	80.5		23.3	23.3	23.3		4.0	4.0
Actuated g/C Ratio	0.05	0.46	0.46	0.21	0.62		0.18	0.18	0.18		0.03	0.03
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	87	1631	709	366	2178		596	323	283		55	47
v/s Ratio Prot	0.02	c0.46		c0.21	0.27		c0.15	0.02			c0.03	
v/s Ratio Perm			0.20						0.10			0.00
v/c Ratio	0.48	0.99	0.43	1.01	0.44		0.85	0.13	0.56		0.96	0.02
Uniform Delay, d1	60.2	35.0	23.7	51.7	13.2		51.8	45.0	48.8		63.1	61.3
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	4.2	20.7	0.4	48.4	0.1		10.8	0.2	2.4		107.4	0.2
Delay (s)	64.4	55.7	24.1	100.1	13.3		62.6	45.2	51.2		170.5	61.5
Level of Service	E	E	C	F	B		E	D	D		F	E
Approach Delay (s)		48.8			37.2			57.0			129.5	
Approach LOS		D			D			E			F	

Intersection Summary			
HCM Average Control Delay	48.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	130.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	92.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

19: Main Street & Vintage Parkway

11/6/2006

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑	↑↑↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3503		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3539	3503		1770	1583
Volume (vph)	40	840	690	50	90	40
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	884	726	53	95	42
RTOR Reduction (vph)	0	0	4	0	0	36
Lane Group Flow (vph)	42	884	775	0	95	6
Turn Type	Prot					Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	3.9	44.3	36.4		9.0	9.0
Effective Green, g (s)	3.9	45.3	37.4		9.0	9.0
Actuated g/C Ratio	0.06	0.73	0.60		0.14	0.14
Clearance Time (s)	4.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	111	2573	2103		256	229
v/s Ratio Prot	0.02	c0.25	c0.22		c0.05	
v/s Ratio Perm						0.00
v/c Ratio	0.38	0.34	0.37		0.37	0.03
Uniform Delay, d1	28.0	3.1	6.4		24.1	22.9
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	2.2	0.1	0.1		0.9	0.0
Delay (s)	30.2	3.2	6.5		25.0	22.9
Level of Service	C	A	A		C	C
Approach Delay (s)		4.4	6.5		24.4	
Approach LOS		A	A		C	

Intersection Summary			
HCM Average Control Delay	6.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	62.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	39.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

20: Main Street & O'Hara Avenue

11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑↱			↰↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.94			0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1770	1863	1583	1770	1854		1770	1751			1796	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.73	1.00			0.86	
Satd. Flow (perm)	1770	1863	1583	1770	1854		1361	1751			1580	
Volume (vph)	20	810	130	60	640	20	140	60	40	30	40	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	853	137	63	674	21	147	63	42	32	42	11
RTOR Reduction (vph)	0	0	49	0	1	0	0	29	0	0	7	0
Lane Group Flow (vph)	21	853	88	63	694	0	147	76	0	0	78	0
Turn Type	Prot		Perm	Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4				2			6		
Actuated Green, G (s)	1.4	48.5	48.5	3.4	50.5		11.5	11.5			12.5	
Effective Green, g (s)	1.4	49.5	49.5	3.4	51.5		12.5	12.5			12.5	
Actuated g/C Ratio	0.02	0.64	0.64	0.04	0.67		0.16	0.16			0.16	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	32	1191	1012	78	1234		220	283			255	
v/s Ratio Prot	0.01	c0.46		c0.04	0.37			0.04				
v/s Ratio Perm			0.06				c0.11				0.05	
v/c Ratio	0.66	0.72	0.09	0.81	0.56		0.67	0.27			0.31	
Uniform Delay, d1	37.8	9.3	5.3	36.7	6.9		30.5	28.5			28.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	39.4	2.1	0.0	43.8	0.6		7.5	0.5			0.7	
Delay (s)	77.1	11.4	5.4	80.4	7.5		38.0	29.0			29.3	
Level of Service	E	B	A	F	A		D	C			C	
Approach Delay (s)		11.9			13.6			34.2			29.3	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM Average Control Delay	15.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	77.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
21: Cypress Road & Empire Avenue

2010 PM with Ramps
11/6/2006

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↱		↰	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.96		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3411		1770	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	3411		1770	3539
Volume (vph)	150	260	690	220	260	690
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	158	274	726	232	274	726
RTOR Reduction (vph)	0	214	49	0	0	0
Lane Group Flow (vph)	158	60	909	0	274	726
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	9.7	9.7	17.0		8.1	29.1
Effective Green, g (s)	10.7	10.7	18.0		8.1	30.1
Actuated g/C Ratio	0.22	0.22	0.37		0.17	0.62
Clearance Time (s)	5.0	5.0	5.0		4.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	388	347	1258		294	2183
v/s Ratio Prot	c0.09		c0.27		c0.15	0.21
v/s Ratio Perm		0.04				
v/c Ratio	0.41	0.17	0.72		0.93	0.33
Uniform Delay, d1	16.3	15.5	13.3		20.1	4.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.7	0.2	2.1		34.8	0.1
Delay (s)	17.0	15.7	15.3		54.9	4.6
Level of Service	B	B	B		D	A
Approach Delay (s)	16.2		15.3			18.4
Approach LOS	B		B			B

Intersection Summary			
HCM Average Control Delay	16.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	48.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
22: Cypress Road & Main Street

2010 PM with Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↱	↱	↰	↑↑	↱	↰↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	0.95	1.00	0.95	1.00	0.97	0.95	
Frt	1.00	0.98		1.00	0.99	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3456		1770	1756	1504	1770	3539	1583	3433	3526	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3456		1770	1756	1504	1770	3539	1583	3433	3526	
Volume (vph)	100	380	70	280	380	770	130	400	410	1120	780	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	400	74	295	400	811	137	421	432	1179	821	21
RTOR Reduction (vph)	0	12	0	0	1	26	0	0	19	0	1	0
Lane Group Flow (vph)	105	462	0	295	420	764	137	421	413	1179	841	0
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		
Protected Phases	7	4		3	8	1	5	2	3	1	6	
Permitted Phases						8			2			
Actuated Green, G (s)	8.0	21.7		21.0	34.7	78.8	14.4	24.0	45.0	44.1	53.7	
Effective Green, g (s)	8.0	21.7		21.0	34.7	78.8	14.4	24.0	45.0	44.1	53.7	
Actuated g/C Ratio	0.06	0.17		0.17	0.27	0.62	0.11	0.19	0.35	0.35	0.42	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	112	591		293	481	935	201	670	562	1194	1493	
v/s Ratio Prot	0.06	0.13		c0.17	c0.24	0.28	0.08	0.12	c0.12	c0.34	0.24	
v/s Ratio Perm						0.22			0.14			
v/c Ratio	0.94	0.78		1.01	0.87	0.82	0.68	0.63	0.73	0.99	0.56	
Uniform Delay, d1	59.2	50.3		52.9	43.9	18.5	54.0	47.3	35.7	41.1	27.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	64.8	6.7		54.3	15.9	5.6	9.2	4.4	4.9	22.8	1.5	
Delay (s)	123.9	57.0		107.2	59.8	24.1	63.2	51.7	40.6	63.9	29.2	
Level of Service	F	E		F	E	C	E	D	D	E	C	
Approach Delay (s)		69.1			50.3			48.5			49.4	
Approach LOS		E			D			D			D	

Intersection Summary			
HCM Average Control Delay	51.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	126.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	97.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
23: Neroly Road & Live Oak Ave

2010 PM with Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↱			↰↑↱			↰↑↱	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	20	280	220	120	210	100	70	140	60	80	180	30
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	295	232	126	221	105	74	147	63	84	189	32

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	168	379	237	216	284	305
Volume Left (vph)	21	0	126	0	74	84
Volume Right (vph)	0	232	0	105	63	32
Hadj (s)	0.10	-0.39	0.30	-0.31	-0.05	0.03
Departure Headway (s)	8.1	7.6	8.5	7.9	7.9	7.9
Degree Utilization, x	0.38	0.80	0.56	0.47	0.62	0.67
Capacity (veh/h)	429	461	400	428	425	427
Control Delay (s)	14.8	33.3	20.5	16.5	23.1	25.3
Approach Delay (s)	27.6		18.6		23.1	25.3
Approach LOS	D		C		C	D

Intersection Summary			
Delay	23.8		
HCM Level of Service	C		
Intersection Capacity Utilization	59.3%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
24: Laurel Road & Live Oak Avenue

2010 PM with Ramps
11/6/2006

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰↰	↑↑↑	↑↑↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	0.91	0.91		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3433	5085	5050		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	3433	5085	5050		1770	1583
Volume (vph)	360	1970	1450	70	290	130
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	379	2074	1526	74	305	137
RTOR Reduction (vph)	0	0	8	0	0	103
Lane Group Flow (vph)	379	2074	1592	0	305	34
Turn Type	Prot					Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	9.5	34.1	20.6		13.7	13.7
Effective Green, g (s)	9.5	34.1	20.6		13.7	13.7
Actuated g/C Ratio	0.17	0.61	0.37		0.25	0.25
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	584	3108	1864		435	389
v/s Ratio Prot	0.11	c0.41	c0.32		c0.17	
v/s Ratio Perm						0.02
v/c Ratio	0.65	0.67	0.85		0.70	0.09
Uniform Delay, d1	21.6	7.1	16.2		19.2	16.2
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	2.5	0.6	4.0		5.1	0.1
Delay (s)	24.1	7.7	20.3		24.2	16.3
Level of Service	C	A	C		C	B
Approach Delay (s)		10.2	20.3		21.8	
Approach LOS		B	C		C	

Intersection Summary			
HCM Average Control Delay	14.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	55.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

25: Laurel Road & Empire Avenue

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.98		1.00	0.97		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3448		1770	3484		1770	3424		1770	3285	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3448		1770	3484		1770	3424		1770	3285	
Volume (vph)	460	1490	310	110	1030	120	160	430	120	180	360	330
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	484	1568	326	116	1084	126	168	453	126	189	379	347
RTOR Reduction (vph)	0	14	0	0	7	0	0	21	0	0	139	0
Lane Group Flow (vph)	484	1880	0	116	1203	0	168	558	0	189	587	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	32.0	64.0		8.0	40.0		11.0	19.0		13.0	21.0	
Effective Green, g (s)	32.0	64.0		8.0	40.0		11.0	19.0		13.0	21.0	
Actuated g/C Ratio	0.27	0.53		0.07	0.33		0.09	0.16		0.11	0.18	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	472	1839		118	1161		162	542		192	575	
v/s Ratio Prot	c0.27	c0.55		0.07	0.35		0.09	0.16		c0.11	c0.18	
v/s Ratio Perm												
v/c Ratio	1.03	1.02		0.98	1.04		1.04	1.03		0.98	1.02	
Uniform Delay, d1	44.0	28.0		55.9	40.0		54.5	50.5		53.4	49.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	48.1	26.7		77.1	36.1		80.8	46.4		60.0	43.1	
Delay (s)	92.1	54.7		133.0	76.1		135.3	96.9		113.4	92.6	
Level of Service	F	D		F	E		F	F		F	F	
Approach Delay (s)		62.3			81.1			105.5			96.9	
Approach LOS		E			F			F			F	

Intersection Summary			
HCM Average Control Delay	78.9	HCM Level of Service	E
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	100.5%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project WITH RAMPS                           10/24/06
========================================================================
INTERSECTION     1 Minaker/Wilbur                    Oakley
Count Date                   Time                Peak Hour
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            20   10   10
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    10 ---  1.0   1.0  1.1  1.1   1.1 ---   10  RIGHT
                                                          STREET NAME:
THRU   780 ---> 2.1  (NO. OF LANES)   2.1<---  420  THRU  Wilbur

RIGHT  190 ---  1.1   1.1  1.1  1.0   1.0 ---   50  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  70    0   60                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Minaker
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO        V/C
------------------------------------------------------------------------
NB  RIGHT (R)      60         10 *     1650     0.0061
    THRU (T)        0          0       1650     0.0000
    LEFT (L)       70         70       1650     0.0424     0.0424
    T + L                     70       1650     0.0424
------------------------------------------------------------------------
SB  RIGHT (R)      20         10 *     1650     0.0061
    THRU (T)       10         10       1650     0.0061
    LEFT (L)       10         10       1650     0.0061
    T + L                     20       1650     0.0121     0.0121
------------------------------------------------------------------------
EB  RIGHT (R)     190        190       1650     0.1152
    THRU (T)      780        780       3300     0.2364
    LEFT (L)       10         10       1650     0.0061
    T + R                    970       3300     0.2939     0.2939
------------------------------------------------------------------------
WB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      420        420       3300     0.1273
    LEFT (L)       50         50       1650     0.0303     0.0303
    T + R                    430       3300     0.1303
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.38
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project WITH RAMPS                           10/24/06
========================================================================
INTERSECTION     6 Hillcrest/18th St                 Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            40  140   80
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    70 ---  1.0   1.0  1.0  1.0   1.1 ---   40  RIGHT
                                                          STREET NAME:
THRU   950 ---> 2.1  (NO. OF LANES)   2.1<---  510  THRU  18th St

RIGHT  230 ---  1.1   1.0  1.0  1.0   1.0 ---  260  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 190  210  280                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Hillcrest
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO        V/C
------------------------------------------------------------------------
NB  RIGHT (R)     280         20 *     1650     0.0121
    THRU (T)      210        210       1650     0.1273
    LEFT (L)      190        190       1650     0.1152     0.1152
------------------------------------------------------------------------
SB  RIGHT (R)      40          0 *     1650     0.0000
    THRU (T)      140        140       1650     0.0848     0.0848
    LEFT (L)       80         80       1650     0.0485
------------------------------------------------------------------------
EB  RIGHT (R)     230        230       1650     0.1394
    THRU (T)      950        950       3300     0.2879
    LEFT (L)       70         70       1650     0.0424
    T + R                   1180       3300     0.3576     0.3576
------------------------------------------------------------------------
WB  RIGHT (R)      40         40       1650     0.0242
    THRU (T)      510        510       3300     0.1545
    LEFT (L)      260        260       1650     0.1576     0.1576
    T + R                    550       3300     0.1667
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.72
     INTERSECTION LEVEL OF SERVICE:                             C
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project WITH RAMPS                           10/24/06
========================================================================
INTERSECTION     7 Viera/18th St                     Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       2-PHASE SIGNAL
-----------           150   80   70
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   120 ---  1.0   1.1  1.1  1.1   1.1 ---   80  RIGHT
                                                          STREET NAME:
THRU   980 ---> 2.0  (NO. OF LANES)   2.1<---  610  THRU  18th St

RIGHT  190 ---  1.0   1.1  1.1  1.0   1.0 ---   30  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 100   20   20                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Viera
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO        V/C
------------------------------------------------------------------------
NB  RIGHT (R)      20          0 *     1800     0.0000
    THRU (T)       20         20       1800     0.0111
    LEFT (L)      100        100       1800     0.0556     0.0556
    T + L                    120       1800     0.0667
------------------------------------------------------------------------
SB  RIGHT (R)     150        150       1800     0.0833
    THRU (T)       80         80       1800     0.0444
    LEFT (L)       70         70       1800     0.0389
    T + R                    230       1800     0.1278
    T + L                    150       1800     0.0833
    T + R + L                300       1800     0.1667     0.1667
------------------------------------------------------------------------
EB  RIGHT (R)     190         90 *     1800     0.0500
    THRU (T)      980        980       3600     0.2722     0.2722
    LEFT (L)      120        120       1800     0.0667
------------------------------------------------------------------------
WB  RIGHT (R)      80         80       1800     0.0444
    THRU (T)      610        610       3600     0.1694
    LEFT (L)       30         30       1800     0.0167     0.0167
    T + R                    690       3600     0.1917
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.51
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project WITH RAMPS                           10/24/06
========================================================================
INTERSECTION     8 Phillips Lane/18th Street         Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------           310   10  250
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   280 ---  1.0   1.1  1.1  2.0   1.0 ---  230  RIGHT
                                                          STREET NAME:
THRU   780 ---> 2.1  (NO. OF LANES)   2.0<---  410  THRU  18th Street

RIGHT   20 ---  1.1   1.0  1.1  1.1   1.0 ---   20  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  20   10   50                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Phillips Lane
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO        V/C
------------------------------------------------------------------------
NB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)       10         10       1650     0.0061
    LEFT (L)       20         20       1650     0.0121     0.0121
    T + R                     60       1650     0.0364
------------------------------------------------------------------------
SB  RIGHT (R)     310        310       1650     0.1879
    THRU (T)       10         10       1650     0.0061
    LEFT (L)      250        250       3000     0.0833
    T + R                    320       1650     0.1939     0.1939
------------------------------------------------------------------------
EB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)      780        780       3300     0.2364
    LEFT (L)      280        280       1650     0.1697     0.1697
    T + R                    800       3300     0.2424
------------------------------------------------------------------------
WB  RIGHT (R)     230         93 *     1650     0.0564
    THRU (T)      410        410       3300     0.1242     0.1242
    LEFT (L)       20         20       1650     0.0121
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.50
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project WITH RAMPS                           10/24/06
========================================================================
INTERSECTION     9 SR 160 SB Ramp/Main Street        Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            20   30   90
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    30 ---  1.0   1.1  1.1  1.0   1.0 ---  100  RIGHT
                                                          STREET NAME:
THRU   900 ---> 2.1  (NO. OF LANES)   2.0<---  560  THRU  Main Street

RIGHT  160 ---  1.1   1.1  1.1  1.9   2.0 ---  920  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  40   20  140                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 SB Ramp
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     140        140       1650     0.0848
    THRU (T)       20         20       1650     0.0121
    LEFT (L)       40         40       1650     0.0242
    T + L                     60       1650     0.0364     0.0364
------------------------------------------------------------------------
SB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)       30         30       1650     0.0182
    LEFT (L)       90         90       1650     0.0545     0.0545
    T + R                     50       1650     0.0303
------------------------------------------------------------------------
EB  RIGHT (R)     160        160       1650     0.0970
    THRU (T)      900        900       3300     0.2727
    LEFT (L)       30         30       1650     0.0182
    T + R                   1060       3300     0.3212     0.3212
------------------------------------------------------------------------
WB  RIGHT (R)     100         10 *     1650     0.0061
    THRU (T)      560        560       3300     0.1697
    LEFT (L)      920        920       3000     0.3067     0.3067
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.72
     INTERSECTION LEVEL OF SERVICE:                             C
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project WITH RAMPS                           10/24/06
========================================================================
INTERSECTION    10 SR 160 NB Ramp/Main Street        Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0    0    0
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  RIGHT
                                                          STREET NAME:
THRU   990 ---> 3.1  (NO. OF LANES)   3.0<--- 1390  THRU  Main Street

RIGHT  140 ---  1.1   1.0  0.0  2.5   1.0 ---  200  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 190    0 1460                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 NB Ramp
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)    1460       1096 *     3127     0.3505     0.3505
    LEFT (L)      190        190       1720     0.1105
------------------------------------------------------------------------
EB  RIGHT (R)     140        140       1720     0.0814
    THRU (T)      990        990       5160     0.1919
    T + R                   1130       5160     0.2190     0.2190
------------------------------------------------------------------------
WB  THRU (T)     1390       1390       5160     0.2694
    LEFT (L)      200        200       1720     0.1163     0.1163
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.69
     INTERSECTION LEVEL OF SERVICE:                             B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project WITH RAMPS                           10/24/06
========================================================================
INTERSECTION    11 Neroly/Main Street                Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------           110   80  210
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    90 ---  1.0   1.0  1.0  2.0   1.0 ---  150  RIGHT
                                                          STREET NAME:
THRU  1940 ---> 3.1  (NO. OF LANES)   3.0<--- 1270  THRU  Main Street

RIGHT  420 ---  1.1   2.0  1.1  1.1   1.0 ---   80  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 210  100   80                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Neroly
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      80         80       1650     0.0485
    THRU (T)      100        100       1650     0.0606
    LEFT (L)      210        210       3000     0.0700
    T + R                    180       1650     0.1091     0.1091
------------------------------------------------------------------------
SB  RIGHT (R)     110         20 *     1650     0.0121
    THRU (T)       80         80       1650     0.0485
    LEFT (L)      210        210       3000     0.0700     0.0700
------------------------------------------------------------------------
EB  RIGHT (R)     420        420       1650     0.2545
    THRU (T)     1940       1940       4950     0.3919
    LEFT (L)       90         90       1650     0.0545
    T + R                   2360       4950     0.4768     0.4768
------------------------------------------------------------------------
WB  RIGHT (R)     150         35 *     1650     0.0212
    THRU (T)     1270       1270       4950     0.2566
    LEFT (L)       80         80       1650     0.0485     0.0485
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.70
     INTERSECTION LEVEL OF SERVICE:                             B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project WITH RAMPS                           10/24/06
========================================================================
INTERSECTION    12 Sandy/Main Street                 Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0    0    0
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  RIGHT
                                                          STREET NAME:
THRU  2020 ---> 3.1  (NO. OF LANES)   3.0<--- 1390  THRU  Main Street

RIGHT  210 ---  1.1   1.0  0.0  1.0   1.0 ---   40  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 110    0  160                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Sandy
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     160        120 *     1720     0.0698     0.0698
    LEFT (L)      110        110       1720     0.0640
------------------------------------------------------------------------
EB  RIGHT (R)     210        210       1720     0.1221
    THRU (T)     2020       2020       5160     0.3915
    T + R                   2230       5160     0.4322     0.4322
------------------------------------------------------------------------
WB  THRU (T)     1390       1390       5160     0.2694
    LEFT (L)       40         40       1720     0.0233     0.0233
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.53
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
======================================================================
Condition: 2030 No Project NO RAMPS                           11/10/06
======================================================================
INTERSECTION    13 Live Oak/Main Street           Oakley
Count Date                     Time              Peak Hour PM
----------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                     8-PHASE SIGNAL
-----------           80  220  260
                       |    |    |
            ^          |    |    |         ^
            |       <---    v    --->      | Split? N
LEFT   150 ---  1.0   1.1  2.1  2.0   1.1 ---  210  RIGHT
                                                      STREET NAME:
THRU  1810 ---> 3.0  (NO. OF LANES)   3.1<--- 1210  THRU  Main Street

RIGHT  220 ---  1.0   1.0  2.1  1.1   1.0 ---   90  LEFT
            |       <---    ^    --->      |
            v          |    |    |         v
  N                    |    |    |                    SIG WARRANTS:
W + E                140   30  160                       Urb=Y, Rur=Y
  S                 LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
======================================================================
               ORIGINAL   ADJUSTED              V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*  CAPACITY   RATIO       V/C
----------------------------------------------------------------------
NB  RIGHT (R)     160        160       1650    0.0970     0.0970
    THRU (T)       30         30       3300    0.0091
    LEFT (L)      140        140       1650    0.0848
    T + R                    190       3300    0.0576
----------------------------------------------------------------------
SB  RIGHT (R)      80         80       1650    0.0485
    THRU (T)      220        220       3300    0.0667
    LEFT (L)      260        260       3000    0.0867     0.0867
    T + R                    300       3300    0.0909
----------------------------------------------------------------------
EB  RIGHT (R)     220         80 *     1650    0.0485
    THRU (T)     1810       1810       4950    0.3657     0.3657
    LEFT (L)      150        150       1650    0.0909
----------------------------------------------------------------------
WB  RIGHT (R)     210        210       1650    0.1273
    THRU (T)     1210       1210       4950    0.2444
    LEFT (L)       90         90       1650    0.0545     0.0545
    T + R                   1420       4950    0.2869
======================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.60
     INTERSECTION LEVEL OF SERVICE:                            A
======================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
======================================================================
Condition: 2030 No Project WITH RAMPS                         10/24/06
======================================================================
INTERSECTION    14 Big Break/Main Street           Oakley
Count Date                     Time              Peak Hour PM
----------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                     5-PHASE SIGNAL
-----------          230   40   90
                       |    |    |
            ^          |    |    |         ^
            |       <---    v    --->      | Split? N
LEFT   270 ---  1.0   1.0  1.1  1.1   1.0 ---   80  RIGHT
                                                      STREET NAME:
THRU  1780 ---> 2.0  (NO. OF LANES)   2.0<--- 1160  THRU  Main Street

RIGHT  180 ---  1.0   1.0  1.1  1.1   1.0 ---   90  LEFT
            |       <---    ^    --->      |
            v          |    |    |         v
  N                    |    |    |                    SIG WARRANTS:
W + E                120   60   90                       Urb=Y, Rur=Y
  S                 LEFT THRU RIGHT Split? N

               STREET NAME: Big Break
======================================================================
               ORIGINAL   ADJUSTED              V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*  CAPACITY   RATIO       V/C
----------------------------------------------------------------------
NB  RIGHT (R)      90         90       1650    0.0545
    THRU (T)       60         60       1650    0.0364
    LEFT (L)      120        120       1650    0.0727     0.0727
    T + R                    150       1650    0.0909
----------------------------------------------------------------------
SB  RIGHT (R)     230          0 *     1650    0.0000
    THRU (T)       40         40       1650    0.0242
    LEFT (L)       90         90       1650    0.0545
    T + L                    130       1650    0.0788     0.0788
----------------------------------------------------------------------
EB  RIGHT (R)     180         60 *     1650    0.0364
    THRU (T)     1780       1780       3300    0.5394     0.5394
    LEFT (L)      270        270       1650    0.1636
----------------------------------------------------------------------
WB  RIGHT (R)      80          0 *     1650    0.0000
    THRU (T)     1160       1160       3300    0.3515
    LEFT (L)       90         90       1650    0.0545     0.0545
======================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.75
     INTERSECTION LEVEL OF SERVICE:                            C
======================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
======================================================================
Condition: 2030 No Project WITH RAMPS                         10/24/06
======================================================================
INTERSECTION    17 Empire Ave/Oakley Road           Oakley
Count Date                     Time              Peak Hour PM
----------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                     6-PHASE SIGNAL
-----------          150  520  150
                       |    |    |
            ^          |    |    |         ^
            |       <---    v    --->      | Split? Y
LEFT   250 ---  2.1   1.0  1.0  1.0   1.0 ---   80  RIGHT
                                                      STREET NAME:
THRU    60 ---> 1.1  (NO. OF LANES)   1.1<---   50  THRU  Oakley Road

RIGHT  290 ---  1.0   1.0  2.1  1.1   1.1 ---   80  LEFT
            |       <---    ^    --->      |
            v          |    |    |         v
  N                    |    |    |                    SIG WARRANTS:
W + E                280  570   30                       Urb=Y, Rur=Y
  S                 LEFT THRU RIGHT Split? N

               STREET NAME: Empire Ave
======================================================================
               ORIGINAL   ADJUSTED              V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*  CAPACITY   RATIO       V/C
----------------------------------------------------------------------
NB  RIGHT (R)      30         30       1650    0.0182
    THRU (T)      570        570       3300    0.1727
    LEFT (L)      280        280       1650    0.1697     0.1697
    T + R                    600       3300    0.1818
----------------------------------------------------------------------
SB  RIGHT (R)     150         13 *     1650    0.0079
    THRU (T)      520        520       1650    0.3152     0.3152
    LEFT (L)      150        150       1650    0.0909
----------------------------------------------------------------------
EB  RIGHT (R)     290         10 *     1650    0.0061
    THRU (T)       60         60       1650    0.0364
    LEFT (L)      250        250       3000    0.0833
    T + L                    310       3000    0.1033     0.1033
----------------------------------------------------------------------
WB  RIGHT (R)      80          0 *     1650    0.0000
    THRU (T)       50         50       1650    0.0303
    LEFT (L)       80         80       1650    0.0485
    T + L                    130       1650    0.0788     0.0788
======================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.67
     INTERSECTION LEVEL OF SERVICE:                            B
======================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
======================================================================
Condition: 2030 No Project WITH RAMPS                         10/24/06
======================================================================
INTERSECTION    18 Empire Avenue/Main Street        Oakley
Count Date                     Time              Peak Hour PM
----------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                     6-PHASE SIGNAL
-----------           30   20   30
                       |    |    |
            ^          |    |    |         ^
            |       <---    v    --->      | Split? N
LEFT    40 ---  1.0   1.0  1.1  1.1   1.1 ---   20  RIGHT
                                                      STREET NAME:
THRU  1540 ---> 2.0  (NO. OF LANES)   2.1<---  900  THRU  Main Street

RIGHT  450 ---  1.0   2.0  1.0  1.0   1.0 ---  350  LEFT
            |       <---    ^    --->      |
            v          |    |    |         v
  N                    |    |    |                    SIG WARRANTS:
W + E                480   40  380                       Urb=Y, Rur=Y
  S                 LEFT THRU RIGHT Split? Y

               STREET NAME: Empire Avenue
======================================================================
               ORIGINAL   ADJUSTED              V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*  CAPACITY   RATIO       V/C
----------------------------------------------------------------------
NB  RIGHT (R)     380         30 *     1650    0.0182
    THRU (T)       40         40       1650    0.0242
    LEFT (L)      480        480       3000    0.1600     0.1600
----------------------------------------------------------------------
SB  RIGHT (R)      30          0 *     1650    0.0000
    THRU (T)       20         20       1650    0.0121
    LEFT (L)       30         30       1650    0.0182
    T + L                     50       1650    0.0303     0.0303
----------------------------------------------------------------------
EB  RIGHT (R)     450        186 *     1650    0.1127
    THRU (T)     1540       1540       3300    0.4667     0.4667
    LEFT (L)       40         40       1650    0.0242
----------------------------------------------------------------------
WB  RIGHT (R)      20         20       1650    0.0121
    THRU (T)      900        900       3300    0.2727
    LEFT (L)      350        350       1650    0.2121     0.2121
    T + R                    920       3300    0.2788
======================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.87
     INTERSECTION LEVEL OF SERVICE:                            D
======================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project WITH RAMPS                           10/24/06
========================================================================
INTERSECTION    19 Vintage/Main Street               Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------            40    0   90
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    40 ---  1.0   1.0  0.0  1.0   1.1 ---   50  RIGHT
                                                          STREET NAME:
THRU   840 ---> 2.0  (NO. OF LANES)   2.1<---  690  THRU  Main Street

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Vintage
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)      40          0 *     1720     0.0000
    LEFT (L)       90         90       1720     0.0523     0.0523
------------------------------------------------------------------------
EB  THRU (T)      840        840       3440     0.2442     0.2442
    LEFT (L)       40         40       1720     0.0233
------------------------------------------------------------------------
WB  RIGHT (R)      50         50       1720     0.0291
    THRU (T)      690        690       3440     0.2006
    T + R                    740       3440     0.2151
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.30
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project WITH RAMPS                           10/24/06
========================================================================
INTERSECTION    20 O'Hara Avenue/Main Street         Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            10   40   30
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    20 ---  1.0   1.1  1.1  1.1   1.1 ---   20  RIGHT
                                                          STREET NAME:
THRU   810 ---> 1.0  (NO. OF LANES)   1.1<---  640  THRU  Main Street

RIGHT  130 ---  1.0   1.0  1.1  1.1   1.0 ---   60  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 140   60   40                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: O'Hara Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      40         40       1650     0.0242
    THRU (T)       60         60       1650     0.0364
    LEFT (L)      140        140       1650     0.0848     0.0848
    T + R                    100       1650     0.0606
------------------------------------------------------------------------
SB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)       40         40       1650     0.0242
    LEFT (L)       30         30       1650     0.0182
    T + R                     50       1650     0.0303
    T + L                     70       1650     0.0424
    T + R + L                 80       1650     0.0485     0.0485
------------------------------------------------------------------------
EB  RIGHT (R)     130          0 *     1650     0.0000
    THRU (T)      810        810       1650     0.4909     0.4909
    LEFT (L)       20         20       1650     0.0121
------------------------------------------------------------------------
WB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)      640        640       1650     0.3879
    LEFT (L)       60         60       1650     0.0364     0.0364
    T + R                    660       1650     0.4000
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.66
     INTERSECTION LEVEL OF SERVICE:                             B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project WITH RAMPS                           10/24/06
========================================================================
INTERSECTION    21 Empire Avenue/Cypress Road        Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0  690  260
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  2.0  1.0   1.0 ---  260  RIGHT
                                                          STREET NAME:
THRU     0 ---> 0.0  (NO. OF LANES)   0.0<---    0  THRU  Cypress Road

RIGHT    0 ---  0.0   0.0  2.1  1.1   1.0 ---  150  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0  690  220                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     220        220       1720     0.1279
    THRU (T)      690        690       3440     0.2006
    T + R                    910       3440     0.2645     0.2645
------------------------------------------------------------------------
SB  THRU (T)      690        690       3440     0.2006
    LEFT (L)      260        260       1720     0.1512     0.1512
------------------------------------------------------------------------
WB  RIGHT (R)     260          0 *     1720     0.0000
    LEFT (L)      150        150       1720     0.0872     0.0872
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.50
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project WITH RAMPS                           10/24/06
========================================================================
INTERSECTION    22 Main Street/Cypress               Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            20  880 1020
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   100 ---  1.0   1.1  2.1  2.0   2.6 ---  770  RIGHT
                                                          STREET NAME:
THRU   380 ---> 2.1  (NO. OF LANES)   1.1<---  380  THRU  Cypress

RIGHT   70 ---  1.1   1.0  2.0  1.5   1.0 ---  280  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 130  400  410                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Main Street
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     410        130 *     1650     0.0788
    THRU (T)      400        400       3300     0.1212     0.1212
    LEFT (L)      130        130       1650     0.0788
------------------------------------------------------------------------
SB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)      880        880       3300     0.2667
    LEFT (L)     1020       1020       3000     0.3400     0.3400
    T + R                    900       3300     0.2727
------------------------------------------------------------------------
EB  RIGHT (R)      70         70       1650     0.0424
    THRU (T)      380        380       3300     0.1152
    LEFT (L)      100        100       1650     0.0606
    T + R                    450       3300     0.1364     0.1364
------------------------------------------------------------------------
WB  RIGHT (R)     770        209 *     3000     0.0697
    THRU (T)      380        380       1650     0.2303
    LEFT (L)      280        280       1650     0.1697     0.1697
    T + R                    589       3000     0.1963
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.77
     INTERSECTION LEVEL OF SERVICE:                             C
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project WITH RAMPS                           10/24/06
========================================================================
INTERSECTION    24 Live Oak/Laurel                   Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------           130    0  290
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   360 ---  2.0   1.0  0.0  1.0   1.1 ---   70  RIGHT
                                                          STREET NAME:
THRU  1970 ---> 3.0  (NO. OF LANES)   3.1<--- 1450  THRU  Laurel

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)     130          0 *     1720     0.0000
    LEFT (L)      290        290       1720     0.1686     0.1686
------------------------------------------------------------------------
EB  THRU (T)     1970       1970       5160     0.3818
    LEFT (L)      360        360       3127     0.1151     0.1151
------------------------------------------------------------------------
WB  RIGHT (R)      70         70       1720     0.0407
    THRU (T)     1450       1450       5160     0.2810
    T + R                   1520       5160     0.2946     0.2946
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.58
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project WITH RAMPS                           10/24/06
========================================================================
INTERSECTION    25 Empire/Laurel                     Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------           330  360  180
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   460 ---  1.0   1.1  2.1  1.0   1.1 ---  120  RIGHT
                                                          STREET NAME:
THRU  1490 ---> 2.1  (NO. OF LANES)   2.1<--- 1030  THRU  Laurel

RIGHT  310 ---  1.1   1.0  2.1  1.1   1.0 ---  110  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 160  430  120                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     120        120       1650     0.0727
    THRU (T)      430        430       3300     0.1303
    LEFT (L)      160        160       1650     0.0970     0.0970
    T + R                    550       3300     0.1667
------------------------------------------------------------------------
SB  RIGHT (R)     330        330       1650     0.2000
    THRU (T)      360        360       3300     0.1091
    LEFT (L)      180        180       1650     0.1091
    T + R                    690       3300     0.2091     0.2091
------------------------------------------------------------------------
EB  RIGHT (R)     310        310       1650     0.1879
    THRU (T)     1490       1490       3300     0.4515
    LEFT (L)      460        460       1650     0.2788     0.2788
    T + R                   1800       3300     0.5455
------------------------------------------------------------------------
WB  RIGHT (R)     120        120       1650     0.0727
    THRU (T)     1030       1030       3300     0.3121
    LEFT (L)      110        110       1650     0.0667
    T + R                   1150       3300     0.3485     0.3485
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.93
     INTERSECTION LEVEL OF SERVICE:                             E
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

Cumulative (2030) With Project AM

HCM Signalized Intersection Capacity Analysis — 2030 AM & Proj with Ramps
1: Wilbur Avenue & Minaker Drive — 11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↰	↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	0.98		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.97	1.00
Satd. Flow (prot)	1770	3458		1770	3532			1777	1583		1801	1583
Flt Permitted	0.95	1.00		0.95	1.00			0.72	1.00		0.82	1.00
Satd. Flow (perm)	1770	3458		1770	3532			1343	1583		1521	1583
Volume (vph)	20	280	50	30	776	10	150	5	20	10	5	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	295	53	32	817	11	158	5	21	11	5	21
RTOR Reduction (vph)	0	18	0	0	1	0	0	0	17	0	0	17
Lane Group Flow (vph)	21	330	0	32	827	0	0	163	4	0	16	4
Turn Type	Prot			Prot			Perm		Perm	Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		4
Actuated Green, G (s)	1.2	27.9		1.3	28.0			10.9	10.9		10.9	10.9
Effective Green, g (s)	1.2	27.9		1.3	28.0			10.9	10.9		10.9	10.9
Actuated g/C Ratio	0.02	0.54		0.02	0.54			0.21	0.21		0.21	0.21
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	41	1852		44	1898			281	331		318	331
v/s Ratio Prot	0.01	0.10		c0.02	c0.23							
v/s Ratio Perm								c0.12	0.00		0.01	0.00
v/c Ratio	0.51	0.18		0.73	0.44			0.58	0.01		0.05	0.01
Uniform Delay, d1	25.2	6.2		25.2	7.3			18.5	16.3		16.5	16.3
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	10.4	0.0		45.3	0.2			3.0	0.0		0.1	0.0
Delay (s)	35.5	6.3		70.5	7.4			21.6	16.4		16.5	16.4
Level of Service	D	A		E	A			C	B		B	B
Approach Delay (s)		7.9			9.8			21.0			16.4	
Approach LOS		A			A			C			B	

Intersection Summary			
HCM Average Control Delay	10.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	52.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis — 2030 AM & Proj with Ramps
2: Wilbur Avenue & Viera Avenue — 11/6/2006

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱		↰	↑	↰↱	
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	319	30	24	803	70	64
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	336	32	25	845	74	67
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			367		1247	352
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			367		1247	352
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		61	90
cM capacity (veh/h)			1191		187	692

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	367	25	845	141
Volume Left	0	25	0	74
Volume Right	32	0	0	67
cSH	1700	1191	1700	288
Volume to Capacity	0.22	0.02	0.50	0.49
Queue Length 95th (ft)	0	2	0	63
Control Delay (s)	0.0	8.1	0.0	29.0
Lane LOS		A		D
Approach Delay (s)	0.0	0.2		29.0
Approach LOS				D

Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	56.7%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis — 2030 AM & Proj with Ramps
3: Wilbur Avenue & SR 160 SB Off — 11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱		↰	↑↑					↰		↱
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	263	110	280	667	0	0	0	0	102	0	120
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	277	116	295	702	0	0	0	0	107	0	126
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	702			393			1275	1626	335	1626	1684	351
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	702			393			1275	1626	335	1626	1684	351
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			75			100	100	100	0	100	80
cM capacity (veh/h)	891			1162			80	76	661	54	70	645

Direction, Lane #	EB 1	WB 1	WB 2	WB 3	SB 1	SB 2
Volume Total	393	295	351	351	107	126
Volume Left	0	295	0	0	107	0
Volume Right	116	0	0	0	0	126
cSH	1700	1162	1700	1700	54	645
Volume to Capacity	0.23	0.25	0.21	0.21	1.97	0.20
Queue Length 95th (ft)	0	25	0	0	261	18
Control Delay (s)	0.0	9.1	0.0	0.0	615.3	11.9
Lane LOS		A			F	B
Approach Delay (s)	0.0	2.7			289.1	
Approach LOS					F	

Intersection Summary			
Average Delay	43.3		
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis — 2030 AM & Proj with Ramps
4: Wilbur Avenue & SR 160 NB On — 11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑			↑↱		↰		↱			
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	50	315	0	0	687	167	260	0	280	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	53	332	0	0	723	176	274	0	295	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	899			332			798	1336	166	1082	1248	449
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	899			332			798	1336	166	1082	1248	449
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	93			100			0	100	65	100	100	100
cM capacity (veh/h)	751			1225			262	142	849	106	160	557

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2
Volume Total	53	166	166	482	417	274	295
Volume Left	53	0	0	0	0	274	0
Volume Right	0	0	0	0	176	0	295
cSH	751	1700	1700	1700	1700	262	849
Volume to Capacity	0.07	0.10	0.10	0.28	0.25	1.04	0.35
Queue Length 95th (ft)	6	0	0	0	0	272	39
Control Delay (s)	10.2	0.0	0.0	0.0	0.0	109.9	11.5
Lane LOS	B					F	B
Approach Delay (s)	1.4			0.0		58.9	
Approach LOS						F	

Intersection Summary			
Average Delay	18.4		
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
5: Wilbur Avenue & Bridgehead Road

2030 AM & Proj with Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	30	459	106	30	466	10	368	30	100	10	30	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	483	112	32	491	11	387	32	105	11	32	21

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1
Volume Total (vph)	32	595	533	524	63
Volume Left (vph)	32	0	32	387	11
Volume Right (vph)	0	112	11	105	21
Hadj (s)	0.53	-0.10	0.03	0.06	-0.13
Departure Headway (s)	8.5	7.8	7.5	7.5	9.4
Degree Utilization, x	0.07	1.29	1.11	1.09	0.16
Capacity (veh/h)	416	468	482	493	378
Control Delay (s)	10.9	170.1	102.5	92.9	14.2
Approach Delay (s)	162.1		102.5	92.9	14.2
Approach LOS	F		F	F	B

Intersection Summary			
Delay	117.8		
HCM Level of Service	F		
Intersection Capacity Utilization	91.2%	ICU Level of Service	F
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
6: E 18th Street & Hillcrest Avenue

2030 AM & Proj with Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑	↱	↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3422		1770	3487		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3422		1770	3487		1770	1863	1583	1770	1863	1583
Volume (vph)	20	320	90	226	466	50	230	100	240	50	90	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	337	95	238	491	53	242	105	253	53	95	63
RTOR Reduction (vph)	0	28	0	0	8	0	0	0	193	0	0	55
Lane Group Flow (vph)	21	404	0	238	536	0	242	105	60	53	95	8
Turn Type	Prot			Prot			Split		Perm	Split		Perm
Protected Phases	1	6		5	2		8	8		4	4	
Permitted Phases									8			4
Actuated Green, G (s)	1.3	15.4		9.2	23.8		13.5	13.5	13.5	6.9	6.9	6.9
Effective Green, g (s)	2.3	17.4		10.7	25.8		15.0	15.0	15.0	8.4	8.4	8.4
Actuated g/C Ratio	0.04	0.27		0.17	0.41		0.24	0.24	0.24	0.13	0.13	0.13
Clearance Time (s)	4.0	5.0		4.5	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	64	938		298	1417		418	440	374	234	246	209
v/s Ratio Prot	0.01	0.12		c0.13	c0.15		c0.14	0.06		0.03	c0.05	
v/s Ratio Perm									0.04			0.01
v/c Ratio	0.33	0.43		0.80	0.38		0.58	0.24	0.16	0.23	0.39	0.04
Uniform Delay, d1	29.8	19.0		25.4	13.2		21.5	19.6	19.2	24.6	25.2	24.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.0	0.3		13.8	0.2		1.9	0.3	0.2	0.5	1.0	0.1
Delay (s)	32.8	19.3		39.2	13.4		23.4	19.9	19.4	25.1	26.2	24.1
Level of Service	C	B		D	B		C	B	B	C	C	C
Approach Delay (s)		19.9			21.3			21.1			25.3	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM Average Control Delay	21.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	63.5	Sum of lost time (s)	9.0
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
7: E 18th Street & Viera Avenue

2030 AM & Proj with Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↱			↰	↱		✥	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	0.96			1.00	0.85		0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00		0.99	
Satd. Flow (prot)	1770	3539	1583	1770	3401			1788	1583		1694	
Flt Permitted	0.33	1.00	1.00	0.52	1.00			0.70	1.00		0.89	
Satd. Flow (perm)	621	3539	1583	977	3401			1305	1583		1528	
Volume (vph)	110	365	60	20	527	186	150	30	40	38	20	80
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	116	384	63	21	555	196	158	32	42	40	21	84
RTOR Reduction (vph)	0	0	26	0	52	0	0	0	30	0	60	0
Lane Group Flow (vph)	116	384	37	21	699	0	0	190	12	0	85	0
Turn Type	Perm		Perm	Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	28.7	28.7	28.7	28.7	28.7			13.3	13.3		13.3	
Effective Green, g (s)	29.7	29.7	29.7	29.7	29.7			14.3	14.3		14.3	
Actuated g/C Ratio	0.59	0.59	0.59	0.59	0.59			0.29	0.29		0.29	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	369	2102	940	580	2020			373	453		437	
v/s Ratio Prot		0.11			c0.21							
v/s Ratio Perm	0.19		0.02	0.02				c0.15	0.01		0.06	
v/c Ratio	0.31	0.18	0.04	0.04	0.35			0.51	0.03		0.19	
Uniform Delay, d1	5.1	4.6	4.2	4.2	5.2			14.9	12.8		13.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.5	0.0	0.0	0.0	0.1			1.1	0.0		0.2	
Delay (s)	5.6	4.7	4.2	4.2	5.3			16.0	12.9		13.7	
Level of Service	A	A	A	A	A			B	B		B	
Approach Delay (s)		4.8			5.3			15.4			13.7	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	7.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	53.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: E 18th Street & Phillips Lane

2030 AM & Proj with Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱	↰	↱		↰↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.97	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.90		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3525		1770	3539	1583	1770	1679		3433	1631	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3525		1770	3539	1583	1770	1679		3433	1631	
Volume (vph)	80	390	10	20	697	70	20	10	20	40	10	50
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	411	11	21	734	74	21	11	21	42	11	53
RTOR Reduction (vph)	0	1	0	0	0	32	0	20	0	0	49	0
Lane Group Flow (vph)	84	421	0	21	734	42	21	12	0	42	15	0
Turn Type	Prot			Prot		Perm	Split			Split		
Protected Phases	5	2		1	6		7	7		3	3	
Permitted Phases						6						
Actuated Green, G (s)	4.6	42.6		0.9	38.9	38.9	3.1	3.1		5.4	5.4	
Effective Green, g (s)	4.6	42.6		0.9	38.9	38.9	3.1	3.1		5.4	5.4	
Actuated g/C Ratio	0.07	0.63		0.01	0.57	0.57	0.05	0.05		0.08	0.08	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	120	2208		23	2025	906	81	77		273	130	
v/s Ratio Prot	c0.05	c0.12		0.01	c0.21		c0.01	0.01		c0.01	0.01	
v/s Ratio Perm						0.03						
v/c Ratio	0.70	0.19		0.91	0.36	0.05	0.26	0.16		0.15	0.12	
Uniform Delay, d1	31.0	5.4		33.5	7.9	6.4	31.3	31.2		29.2	29.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	16.4	0.0		147.5	0.1	0.0	1.7	0.9		0.3	0.4	
Delay (s)	47.4	5.4		181.0	8.0	6.4	33.0	32.1		29.4	29.5	
Level of Service	D	A		F	A	A	C	C		C	C	
Approach Delay (s)		12.4			12.2			32.5			29.5	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM Average Control Delay	14.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	68.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	41.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

9: E 18th Street & SR 160 SB Off

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰↰	↑↑	↱		↰	↱	↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85		1.00	0.85	1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1719	3378		3335	3438	1538		1730	1538	1719	1646	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.70	1.00	0.49	1.00	
Satd. Flow (perm)	1719	3378		3335	3438	1538		1275	1538	882	1646	
Volume (vph)	10	380	50	1107	647	90	120	10	148	40	20	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	400	53	1165	681	95	126	11	156	42	21	32
RTOR Reduction (vph)	0	8	0	0	0	24	0	0	0	0	28	0
Lane Group Flow (vph)	11	445	0	1165	681	71	0	137	156	42	25	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot		Perm	Perm		Free	Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases						6	8		Free	4		
Actuated Green, G (s)	1.4	34.4		56.0	89.0	89.0		16.6	120.0	16.6	16.6	
Effective Green, g (s)	1.4	35.4		56.0	90.0	90.0		16.6	120.0	16.6	16.6	
Actuated g/C Ratio	0.01	0.29		0.47	0.75	0.75		0.14	1.00	0.14	0.14	
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0		4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	4.0	4.0		2.0		2.0	2.0	
Lane Grp Cap (vph)	20	997		1556	2579	1154		176	1538	122	228	
v/s Ratio Prot	0.01	c0.13		c0.35	0.20						0.02	
v/s Ratio Perm						0.05		c0.11	0.10	0.05		
v/c Ratio	0.55	0.45		0.75	0.26	0.06		0.78	0.10	0.34	0.11	
Uniform Delay, d1	59.0	34.3		26.2	4.7	3.9		49.9	0.0	46.8	45.2	
Progression Factor	1.00	1.00		0.65	0.21	0.01		1.00	1.00	1.00	1.00	
Incremental Delay, d2	28.9	1.4		1.8	0.2	0.1		17.7	0.1	0.6	0.1	
Delay (s)	87.9	35.8		18.9	1.2	0.1		67.6	0.1	47.4	45.3	
Level of Service	F	D		B	A	A		E	A	D	D	
Approach Delay (s)		37.0			11.8			31.7			46.2	
Approach LOS		D			B			C			D	

Intersection Summary			
HCM Average Control Delay	19.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

10: Main Street & SR 160 NB On

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↱		↰	↑↑↑	↰	↱↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		1.00	0.91	1.00	0.88
Frt	0.98		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	4836		1719	4940	1719	2707
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	4836		1719	4940	1719	2707
Volume (vph)	488	80	106	1664	180	1288
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	514	84	112	1752	189	1356
RTOR Reduction (vph)	16	0	0	0	0	29
Lane Group Flow (vph)	582	0	112	1752	189	1327
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Turn Type			Prot			pm+ov
Protected Phases	2		1	6	8	1
Permitted Phases						8
Actuated Green, G (s)	38.3		50.7	94.0	17.0	67.7
Effective Green, g (s)	39.3		51.7	95.0	17.0	68.7
Actuated g/C Ratio	0.33		0.43	0.79	0.14	0.57
Clearance Time (s)	5.0		5.0	5.0	4.0	5.0
Vehicle Extension (s)	4.0		3.0	4.0	2.0	3.0
Lane Grp Cap (vph)	1584		741	3911	244	1640
v/s Ratio Prot	0.12		0.07	c0.35	0.11	c0.35
v/s Ratio Perm						0.14
v/c Ratio	0.37		0.15	0.45	0.77	0.81
Uniform Delay, d1	30.8		20.8	4.0	49.7	20.4
Progression Factor	0.59		0.48	0.48	1.00	1.00
Incremental Delay, d2	0.6		0.1	0.3	13.0	3.0
Delay (s)	19.0		10.1	2.2	62.7	23.5
Level of Service	B		B	A	E	C
Approach Delay (s)	19.0			2.7	28.3	
Approach LOS	B			A	C	

Intersection Summary			
HCM Average Control Delay	15.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

11: Main Street & Bridgehead Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↑	↱	↰↰	↱		↰↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00	0.97	1.00		0.97	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	4833		1719	4940	1538	3335	1745		3335	1810	1538
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1719	4833		1719	4940	1538	3335	1745		3335	1810	1538
Volume (vph)	253	1303	220	50	1369	357	260	129	40	108	126	141
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	266	1372	232	53	1441	376	274	136	42	114	133	148
RTOR Reduction (vph)	0	15	0	0	0	200	0	10	0	0	0	133
Lane Group Flow (vph)	266	1589	0	53	1441	176	274	168	0	114	133	15
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot		Perm	Split			Split		Perm
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases						6						7
Actuated Green, G (s)	20.7	69.2		6.6	55.1	55.1	15.2	15.2		12.0	12.0	12.0
Effective Green, g (s)	20.7	70.2		6.6	56.1	56.1	15.2	15.2		12.0	12.0	12.0
Actuated g/C Ratio	0.17	0.59		0.05	0.47	0.47	0.13	0.13		0.10	0.10	0.10
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	297	2827		95	2309	719	422	221		334	181	154
v/s Ratio Prot	c0.15	0.33		0.03	c0.29		0.08	c0.10		0.03	c0.07	
v/s Ratio Perm						0.11						0.01
v/c Ratio	0.90	0.56		0.56	0.62	0.24	0.65	0.76		0.34	0.73	0.10
Uniform Delay, d1	48.6	15.4		55.3	24.0	19.2	49.9	50.6		50.3	52.5	49.1
Progression Factor	1.04	0.74		1.43	0.36	1.03	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	21.2	0.6		3.4	1.1	0.7	2.6	12.4		0.2	12.5	0.1
Delay (s)	71.8	12.0		82.3	9.8	20.5	52.4	63.0		50.5	64.9	49.2
Level of Service	E	B		F	A	C	D	E		D	E	D
Approach Delay (s)		20.5			14.0			56.6			54.9	
Approach LOS		C			B			E			D	

Intersection Summary			
HCM Average Control Delay	24.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

12: Main Street & Sandy Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↱		↰	↑	↱	↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	4908		1719	4921		1719	1863	1538	1770	1610	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	4908		1719	4921		1719	1863	1538	1770	1610	
Volume (vph)	67	1325	60	50	1701	55	20	7	50	56	6	55
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	71	1395	63	53	1791	58	21	7	53	59	6	58
RTOR Reduction (vph)	0	2	0	0	2	0	0	0	51	0	53	0
Lane Group Flow (vph)	71	1456	0	53	1847	0	21	7	2	59	11	0
Heavy Vehicles (%)	2%	5%	5%	5%	5%	2%	5%	2%	5%	2%	2%	2%
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8			
Actuated Green, G (s)	11.4	80.3		7.3	76.2		4.3	5.5	5.5	9.9	10.6	
Effective Green, g (s)	11.4	80.8		7.8	77.2		4.3	5.5	5.5	9.9	11.1	
Actuated g/C Ratio	0.10	0.67		0.06	0.64		0.04	0.05	0.05	0.08	0.09	
Clearance Time (s)	4.0	4.5		4.5	5.0		4.0	4.0	4.0	4.0	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	168	3305		112	3166		62	85	70	146	149	
v/s Ratio Prot	0.04	c0.30		0.03	c0.38		0.01	0.00		c0.03	c0.01	
v/s Ratio Perm									0.00			
v/c Ratio	0.42	0.44		0.47	0.58		0.34	0.08	0.03	0.40	0.08	
Uniform Delay, d1	51.2	9.1		54.1	12.2		56.5	54.8	54.7	52.3	49.8	
Progression Factor	0.80	0.90		1.41	0.08		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.5	0.4		2.7	0.7		3.2	0.4	0.2	1.8	0.2	
Delay (s)	42.5	8.5		78.8	1.7		59.7	55.3	54.9	54.1	50.0	
Level of Service	D	A		E	A		E	E	D	D	D	
Approach Delay (s)		10.1			3.9			56.2			51.9	
Approach LOS		B			A			E			D	

Intersection Summary			
HCM Average Control Delay	9.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

13: Main Street & Live Oak Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑	↱	↰	↑↑↱		↰	↑↱		↰↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91		1.00	0.95		0.97	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.98		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	4940	1538	1719	4844		1719	3448		3433	3379	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	4940	1538	1719	4844		1719	3448		3433	3379	
Volume (vph)	212	1093	132	55	1627	310	146	326	55	108	119	51
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	223	1151	139	58	1713	326	154	343	58	114	125	54
RTOR Reduction (vph)	0	0	57	0	21	0	0	12	0	0	43	0
Lane Group Flow (vph)	223	1151	82	58	2018	0	154	389	0	114	136	0
Heavy Vehicles (%)	2%	5%	5%	5%	5%	2%	5%	2%	5%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2		6							
Actuated Green, G (s)	18.8	69.9	69.9	6.9	58.0		15.2	18.3		7.9	10.0	
Effective Green, g (s)	18.8	70.9	70.9	6.9	59.0		16.2	18.3		7.9	10.0	
Actuated g/C Ratio	0.16	0.59	0.59	0.06	0.49		0.13	0.15		0.07	0.08	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		5.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	277	2919	909	99	2382		232	526		226	282	
v/s Ratio Prot	c0.13	0.23		0.03	c0.42		c0.09	c0.11		0.03	0.04	
v/s Ratio Perm			0.05									
v/c Ratio	0.81	0.39	0.09	0.59	0.85		0.66	0.74		0.50	0.48	
Uniform Delay, d1	48.8	13.1	10.6	55.2	26.6		49.3	48.6		54.2	52.5	
Progression Factor	0.77	0.55	0.20	1.15	0.31		1.00	1.00		1.00	1.00	
Incremental Delay, d2	15.0	0.4	0.2	7.6	3.5		7.0	5.4		1.8	1.3	
Delay (s)	52.3	7.6	2.3	70.8	11.7		56.3	54.0		55.9	53.8	
Level of Service	D	A	A	E	B		E	D		E	D	
Approach Delay (s)		13.7			13.3			54.6			54.6	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM Average Control Delay	21.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

14: Main Street & Big Break Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↱			↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.97	1.00
Satd. Flow (prot)	1770	3438	1583	1770	3438	1583	1770	1723			1799	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.45	1.00			0.76	1.00
Satd. Flow (perm)	1770	3438	1583	1770	3438	1583	830	1723			1419	1583
Volume (vph)	201	988	60	60	1748	80	90	20	20	100	40	178
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	212	1040	63	63	1840	84	95	21	21	105	42	187
RTOR Reduction (vph)	0	0	18	0	0	23	0	18	0	0	0	162
Lane Group Flow (vph)	212	1040	45	63	1840	61	95	24	0	0	147	25
Heavy Vehicles (%)	2%	5%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot		custom	Prot		custom	Perm			Perm		Perm
Protected Phases	5			1				3			7	
Permitted Phases		2	2		6	6	3			7		7
Actuated Green, G (s)	18.7	84.3	84.3	6.7	72.3	72.3	15.0	15.0			15.0	15.0
Effective Green, g (s)	18.7	85.3	85.3	6.7	73.3	73.3	16.0	16.0			16.0	16.0
Actuated g/C Ratio	0.16	0.71	0.71	0.06	0.61	0.61	0.13	0.13			0.13	0.13
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0	5.0	5.0	5.0			5.0	5.0
Vehicle Extension (s)	3.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)	276	2444	1125	99	2100	967	111	230			189	211
v/s Ratio Prot	c0.12			0.04				0.01				
v/s Ratio Perm		0.30	0.03		c0.54	0.04	c0.11				0.10	0.02
v/c Ratio	0.77	0.43	0.04	0.64	0.88	0.06	0.86	0.10			0.78	0.12
Uniform Delay, d1	48.6	7.2	5.2	55.5	19.6	9.5	50.9	45.7			50.3	45.8
Progression Factor	0.91	0.34	0.22	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	11.8	0.5	0.1	9.4	5.5	0.1	42.5	0.1			16.6	0.1
Delay (s)	55.9	2.9	1.2	64.9	25.1	9.6	93.3	45.8			66.9	45.9
Level of Service	E	A	A	E	C	A	F	D			E	D
Approach Delay (s)		11.4			25.7			78.8			55.1	
Approach LOS		B			C			E			E	

Intersection Summary			
HCM Average Control Delay	25.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

15: Oakley Road & Neroly Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	20	79	20	20	227	153	180	296	20	93	223	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	83	21	21	239	161	189	312	21	98	235	21

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	125	421	522	354
Volume Left (vph)	21	21	189	98
Volume Right (vph)	21	161	21	21
Hadj (s)	-0.03	-0.19	0.08	0.05
Departure Headway (s)	8.5	7.1	7.2	7.4
Degree Utilization, x	0.29	0.83	1.04	0.73
Capacity (veh/h)	372	495	508	469
Control Delay (s)	15.0	36.4	77.0	27.9
Approach Delay (s)	15.0	36.4	77.0	27.9
Approach LOS	B	E	F	D

Intersection Summary			
Delay	47.3		
HCM Level of Service	E		
Intersection Capacity Utilization	70.6%	ICU Level of Service	C
Analysis Period (min)	15		

16: Oakley Road & Live Oak Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	30	160	10	70	280	208	50	240	50	119	139	38
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	168	11	74	295	219	53	253	53	125	146	40

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	211	587	358	312
Volume Left (vph)	32	74	53	125
Volume Right (vph)	11	219	53	40
Hadj (s)	0.03	-0.16	-0.02	0.04
Departure Headway (s)	8.2	7.1	7.6	7.8
Degree Utilization, x	0.48	1.15	0.75	0.67
Capacity (veh/h)	400	500	461	439
Control Delay (s)	18.4	114.7	30.2	25.4
Approach Delay (s)	18.4	114.7	30.2	25.4
Approach LOS	C	F	D	D

Intersection Summary			
Delay	61.3		
HCM Level of Service	F		
Intersection Capacity Utilization	82.2%	ICU Level of Service	E
Analysis Period (min)	15		

17: Oakley Road & Empire Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↑	↱		↰↑	↱	↰	↑↑↱		↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95		1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1696	1583		1804	1583	1770	3522		1770	1863	1583
Flt Permitted	0.95	0.96	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1696	1583		1804	1583	1770	3522		1770	1863	1583
Volume (vph)	140	10	229	20	10	20	428	584	20	50	325	110
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	147	11	241	21	11	21	451	615	21	53	342	116
RTOR Reduction (vph)	0	0	225	0	0	19	0	3	0	0	0	83
Lane Group Flow (vph)	77	81	16	0	32	2	451	633	0	53	342	33
Turn Type	Split		Perm	Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8						6
Actuated Green, G (s)	4.2	4.2	4.2		3.9	3.9	19.6	27.8		9.2	17.4	17.4
Effective Green, g (s)	4.2	4.2	4.2		4.9	4.9	20.6	28.8		10.2	18.4	18.4
Actuated g/C Ratio	0.07	0.07	0.07		0.08	0.08	0.32	0.45		0.16	0.29	0.29
Clearance Time (s)	4.0	4.0	4.0		5.0	5.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	110	111	104		138	121	569	1582		282	535	454
v/s Ratio Prot	0.05	c0.05			c0.02		c0.25	0.18		0.03	c0.18	
v/s Ratio Perm			0.01			0.00						0.02
v/c Ratio	0.70	0.73	0.15		0.23	0.01	0.79	0.40		0.19	0.64	0.07
Uniform Delay, d1	29.3	29.4	28.3		27.8	27.4	19.8	11.9		23.4	20.0	16.6
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	17.7	21.2	0.7		0.9	0.0	7.5	0.2		0.3	2.5	0.1
Delay (s)	47.0	50.6	28.9		28.7	27.4	27.3	12.0		23.7	22.5	16.7
Level of Service	D	D	C		C	C	C	B		C	C	B
Approach Delay (s)		36.8			28.2			18.3			21.3	
Approach LOS		D			C			B			C	

Intersection Summary			
HCM Average Control Delay	22.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	64.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	61.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

18: Main Street & Charles Way

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑↱		↰↰	↑	↱		↰↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.98	1.00
Satd. Flow (prot)	1719	3539	1538	1770	3531		3335	1810	1583		1797	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.98	1.00
Satd. Flow (perm)	1719	3539	1538	1770	3531		3335	1810	1583		1797	1538
Volume (vph)	20	813	235	210	1345	20	524	20	200	20	40	50
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	856	247	221	1416	21	552	21	211	21	42	53
RTOR Reduction (vph)	0	0	161	0	1	0	0	0	160	0	0	51
Lane Group Flow (vph)	21	856	86	221	1436	0	552	21	51	0	63	2
Heavy Vehicles (%)	5%	2%	5%	2%	2%	2%	5%	5%	2%	2%	5%	5%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	1.4	25.4	25.4	11.2	35.2		17.3	17.3	17.3		3.0	3.0
Effective Green, g (s)	2.4	26.4	26.4	12.2	36.2		18.3	18.3	18.3		3.0	3.0
Actuated g/C Ratio	0.03	0.35	0.35	0.16	0.48		0.24	0.24	0.24		0.04	0.04
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	54	1231	535	285	1684		804	436	382		71	61
v/s Ratio Prot	0.01	0.24		c0.12	c0.41		c0.17	0.01			c0.04	
v/s Ratio Perm			0.06						0.03			0.00
v/c Ratio	0.39	0.70	0.16	0.78	0.85		0.69	0.05	0.13		0.89	0.03
Uniform Delay, d1	36.0	21.3	17.1	30.5	17.5		26.2	22.1	22.6		36.3	35.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	4.6	1.7	0.1	12.4	4.4		2.4	0.0	0.2		68.6	0.2
Delay (s)	40.6	23.0	17.2	42.9	21.9		28.6	22.2	22.7		104.9	35.3
Level of Service	D	C	B	D	C		C	C	C		F	D
Approach Delay (s)		22.1			24.7			26.9			73.1	
Approach LOS		C			C			C			E	

Intersection Summary			
HCM Average Control Delay	25.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	75.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

19: Main Street & Vintage Parkway

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑	↑↑↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3507		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3539	3507		1770	1583
Volume (vph)	97	506	608	40	60	37
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	102	533	640	42	63	39
RTOR Reduction (vph)	0	0	5	0	0	35
Lane Group Flow (vph)	102	533	677	0	63	4
Turn Type	Prot					Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	4.8	42.1	33.3		6.3	6.3
Effective Green, g (s)	4.8	43.1	34.3		6.3	6.3
Actuated g/C Ratio	0.08	0.75	0.60		0.11	0.11
Clearance Time (s)	4.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	148	2657	2096		194	174
v/s Ratio Prot	c0.06	0.15	c0.19		c0.04	
v/s Ratio Perm						0.00
v/c Ratio	0.69	0.20	0.32		0.32	0.02
Uniform Delay, d1	25.6	2.1	5.8		23.6	22.8
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	12.6	0.0	0.1		1.0	0.1
Delay (s)	38.1	2.1	5.9		24.6	22.9
Level of Service	D	A	A		C	C
Approach Delay (s)		7.9	5.9		23.9	
Approach LOS		A	A		C	

Intersection Summary			
HCM Average Control Delay	8.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	57.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	36.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

20: Main Street & O'Hara Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑↱			↰↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.91			0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1770	1863	1583	1770	1853		1770	1695			1826	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.72	1.00			0.94	
Satd. Flow (perm)	1770	1863	1583	1770	1853		1342	1695			1733	
Volume (vph)	10	492	104	40	551	20	137	40	60	20	90	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	518	109	42	580	21	144	42	63	21	95	11
RTOR Reduction (vph)	0	0	49	0	2	0	0	50	0	0	7	0
Lane Group Flow (vph)	11	518	60	42	599	0	144	55	0	0	120	0
Turn Type	Prot		Perm	Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4				2			6		
Actuated Green, G (s)	0.7	28.0	28.0	1.5	28.8		10.1	10.1			10.6	
Effective Green, g (s)	0.7	29.0	29.0	1.5	29.8		10.6	10.6			10.6	
Actuated g/C Ratio	0.01	0.55	0.55	0.03	0.56		0.20	0.20			0.20	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		4.5	4.5			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	23	1017	865	50	1040		268	338			346	
v/s Ratio Prot	0.01	0.28		c0.02	c0.32			0.03				
v/s Ratio Perm			0.04				c0.11				0.07	
v/c Ratio	0.48	0.51	0.07	0.84	0.58		0.54	0.16			0.35	
Uniform Delay, d1	26.0	7.6	5.7	25.7	7.6		19.1	17.6			18.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	14.8	0.4	0.0	69.8	0.8		2.1	0.2			0.6	
Delay (s)	40.9	8.0	5.7	95.5	8.3		21.1	17.8			18.9	
Level of Service	D	A	A	F	A		C	B			B	
Approach Delay (s)		8.2			14.0			19.7			18.9	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM Average Control Delay	13.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	53.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
21: Cypress Road & Empire Avenue

2030 AM & Proj with Ramps
11/6/2006

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↱		↰	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3472		1770	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	3472		1770	3539
Volume (vph)	210	255	827	120	156	468
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	221	268	871	126	164	493
RTOR Reduction (vph)	0	205	17	0	0	0
Lane Group Flow (vph)	221	63	980	0	164	493
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	11.7	11.7	20.6		6.0	30.6
Effective Green, g (s)	12.2	12.2	21.6		6.0	31.6
Actuated g/C Ratio	0.24	0.24	0.42		0.12	0.61
Clearance Time (s)	4.5	4.5	5.0		4.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	417	373	1448		205	2159
v/s Ratio Prot	c0.12		c0.28		c0.09	0.14
v/s Ratio Perm		0.04				
v/c Ratio	0.53	0.17	0.68		0.80	0.23
Uniform Delay, d1	17.3	15.8	12.3		22.3	4.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.2	0.2	1.3		19.6	0.1
Delay (s)	18.5	16.0	13.5		41.9	4.6
Level of Service	B	B	B		D	A
Approach Delay (s)	17.1		13.5			13.9
Approach LOS	B		B			B

Intersection Summary			
HCM Average Control Delay	14.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	51.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
22: Cypress Road & Main Street

2030 AM & Proj with Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↱	↱	↰	↑↑	↱	↰↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	0.95	1.00	0.95	1.00	0.97	0.95	
Frt	1.00	0.97		1.00	0.93	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3431		1770	1643	1504	1770	3539	1583	3433	3528	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3431		1770	1643	1504	1770	3539	1583	3433	3528	
Volume (vph)	40	196	50	380	290	1100	90	591	220	426	506	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	206	53	400	305	1158	95	622	232	448	533	11
RTOR Reduction (vph)	0	25	0	0	35	37	0	0	46	0	1	0
Lane Group Flow (vph)	42	234	0	400	547	844	95	622	186	448	543	0
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		
Protected Phases	7	4		3	8	1	5	2	3	1	6	
Permitted Phases						8			2			
Actuated Green, G (s)	2.3	11.6		21.0	30.3	49.4	7.4	20.5	41.5	19.1	32.2	
Effective Green, g (s)	2.3	11.6		21.0	30.3	49.4	7.4	20.5	41.5	19.1	32.2	
Actuated g/C Ratio	0.03	0.13		0.24	0.34	0.56	0.08	0.23	0.47	0.22	0.37	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	46	451		421	564	911	149	823	817	743	1288	
v/s Ratio Prot	0.02	0.07		c0.23	0.33	c0.20	0.05	c0.18	0.05	0.13	0.15	
v/s Ratio Perm						0.36			0.06			
v/c Ratio	0.91	0.52		0.95	0.97	0.93	0.64	0.76	0.23	0.60	0.42	
Uniform Delay, d1	42.9	35.7		33.1	28.5	17.8	39.1	31.5	13.8	31.1	21.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	99.4	1.0		31.3	30.3	15.0	8.6	4.0	0.1	1.4	0.2	
Delay (s)	142.2	36.7		64.4	58.8	32.8	47.7	35.5	14.0	32.5	21.2	
Level of Service	F	D		E	E	C	D	D	B	C	C	
Approach Delay (s)		51.4			47.7			31.5			26.3	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	39.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	88.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	82.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
23: Neroly Road & Live Oak Ave

2030 AM & Proj with Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↑↱			↰↑↑↱			↰↑↱			↰↑↱	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	20	151	78	66	271	114	259	156	158	98	33	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	159	82	69	285	120	273	164	166	103	35	21

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	101	162	212	263	603	159
Volume Left (vph)	21	0	69	0	273	103
Volume Right (vph)	0	82	0	120	166	21
Hadj (s)	0.14	-0.32	0.20	-0.29	-0.04	0.08
Departure Headway (s)	8.0	7.6	7.7	7.2	6.5	7.6
Degree Utilization, x	0.22	0.34	0.45	0.53	1.08	0.34
Capacity (veh/h)	431	460	458	491	568	443
Control Delay (s)	12.1	13.2	15.7	16.7	87.4	14.4
Approach Delay (s)	12.8		16.3		87.4	14.4
Approach LOS	B		C		F	B

Intersection Summary			
Delay	44.1		
HCM Level of Service	E		
Intersection Capacity Utilization	64.6%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
24: Laurel Road & Live Oak Avenue

2030 AM & Proj with Ramps
11/6/2006

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰↰	↑↑↑	↑↑↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	0.91	0.91		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3433	5085	5033		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	3433	5085	5033		1770	1583
Volume (vph)	317	1026	1836	135	72	335
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	334	1080	1933	142	76	353
RTOR Reduction (vph)	0	0	8	0	0	187
Lane Group Flow (vph)	334	1080	2067	0	76	166
Turn Type	Prot					Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	9.9	50.5	36.6		12.4	12.4
Effective Green, g (s)	9.9	51.5	37.6		13.4	13.4
Actuated g/C Ratio	0.14	0.71	0.52		0.18	0.18
Clearance Time (s)	4.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	466	3592	2596		325	291
v/s Ratio Prot	c0.10	0.21	c0.41		0.04	
v/s Ratio Perm						c0.10
v/c Ratio	0.72	0.30	0.80		0.23	0.57
Uniform Delay, d1	30.2	4.0	14.5		25.4	27.1
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	5.2	0.0	1.8		0.4	2.7
Delay (s)	35.4	4.0	16.3		25.7	29.8
Level of Service	D	A	B		C	C
Approach Delay (s)		11.4	16.3		29.1	
Approach LOS		B	B		C	

Intersection Summary			
HCM Average Control Delay	15.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	72.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

25: Laurel Road & Empire Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.98		1.00	0.99		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3448		1770	3454		1770	3490		1770	3211	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3448		1770	3454		1770	3490		1770	3211	
Volume (vph)	220	728	150	60	1371	261	180	496	50	51	258	420
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	232	766	158	63	1443	275	189	522	53	54	272	442
RTOR Reduction (vph)	0	13	0	0	12	0	0	6	0	0	160	0
Lane Group Flow (vph)	232	911	0	63	1706	0	189	569	0	54	554	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	17.0	72.1		7.7	62.8		14.0	31.0		4.8	21.8	
Effective Green, g (s)	17.0	72.1		7.7	62.8		14.0	31.0		4.8	21.8	
Actuated g/C Ratio	0.13	0.55		0.06	0.48		0.11	0.24		0.04	0.17	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	229	1889		104	1648		188	822		65	532	
v/s Ratio Prot	c0.13	0.26		0.04	c0.49		c0.11	0.16		0.03	c0.17	
v/s Ratio Perm												
v/c Ratio	1.01	0.48		0.61	1.04		1.01	0.69		0.83	1.04	
Uniform Delay, d1	57.3	18.3		60.5	34.4		58.8	45.9		63.0	54.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	62.9	0.2		9.6	31.8		67.0	2.5		56.7	50.1	
Delay (s)	120.2	18.5		70.1	66.2		125.8	48.5		119.7	105.0	
Level of Service	F	B		E	E		F	D		F	F	
Approach Delay (s)		38.9			66.4			67.6			106.0	
Approach LOS		D			E			E			F	

Intersection Summary			
HCM Average Control Delay	66.3	HCM Level of Service	E
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	131.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	102.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

26: Proj Dwy & Bridgehead Road

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑	↱	↰	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	1863	1583	1770	1863
Volume (vph)	76	31	647	92	38	298
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	80	33	681	97	40	314
RTOR Reduction (vph)	0	29	0	32	0	0
Lane Group Flow (vph)	80	4	681	65	40	314
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	7.0	7.0	44.7	44.7	2.1	51.3
Effective Green, g (s)	7.5	7.5	45.7	45.7	2.6	52.3
Actuated g/C Ratio	0.11	0.11	0.67	0.67	0.04	0.77
Clearance Time (s)	4.5	4.5	5.0	5.0	4.5	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	196	175	1256	1067	68	1437
v/s Ratio Prot	c0.05		c0.37		c0.02	0.17
v/s Ratio Perm		0.00		0.04		
v/c Ratio	0.41	0.02	0.54	0.06	0.59	0.22
Uniform Delay, d1	28.1	26.9	5.7	3.8	32.1	2.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.4	0.0	0.5	0.0	12.3	0.1
Delay (s)	29.5	26.9	6.2	3.8	44.4	2.2
Level of Service	C	C	A	A	D	A
Approach Delay (s)	28.7		5.9			7.0
Approach LOS	C		A			A

Intersection Summary			
HCM Average Control Delay	8.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	67.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	44.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

27: Main Street & Proj Dwy Center

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑↑	↑↑↑	↱	↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	5085	5085	1583	1770	1583
Volume (vph)	51	1380	1766	58	56	41
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	54	1453	1859	61	59	43
RTOR Reduction (vph)	0	0	0	19	0	40
Lane Group Flow (vph)	54	1453	1859	42	59	3
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	15.0	101.9	82.4	82.4	9.1	9.1
Effective Green, g (s)	15.5	102.4	82.9	82.9	9.6	9.6
Actuated g/C Ratio	0.13	0.85	0.69	0.69	0.08	0.08
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	229	4339	3513	1094	142	127
v/s Ratio Prot	0.03	c0.29	c0.37		c0.03	
v/s Ratio Perm				0.03		0.00
v/c Ratio	0.24	0.33	0.53	0.04	0.42	0.03
Uniform Delay, d1	46.9	1.8	9.0	5.9	52.5	50.9
Progression Factor	0.94	0.39	0.05	0.00	1.00	1.00
Incremental Delay, d2	0.5	0.2	0.3	0.0	2.0	0.1
Delay (s)	44.8	0.9	0.8	0.0	54.5	51.0
Level of Service	D	A	A	A	D	D
Approach Delay (s)		2.5	0.8		53.0	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	3.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

28: Main Street & Proj Dwy East

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑↑	↑↑↑	↱	↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	5085	5085	1583	1770	1583
Volume (vph)	38	1218	1967	38	30	35
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	40	1282	2071	40	32	37
RTOR Reduction (vph)	0	0	0	9	0	35
Lane Group Flow (vph)	40	1282	2071	31	32	2
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		7	
Permitted Phases				6		7
Actuated Green, G (s)	9.0	104.1	91.6	91.6	6.4	6.4
Effective Green, g (s)	9.0	105.1	92.1	92.1	6.9	6.9
Actuated g/C Ratio	0.08	0.88	0.77	0.77	0.06	0.06
Clearance Time (s)	4.0	5.0	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	133	4454	3903	1215	102	91
v/s Ratio Prot	0.02	c0.25	c0.41		c0.02	
v/s Ratio Perm				0.02		0.00
v/c Ratio	0.30	0.29	0.53	0.03	0.31	0.02
Uniform Delay, d1	52.5	1.2	5.5	3.3	54.3	53.4
Progression Factor	0.90	0.29	0.45	0.15	1.00	1.00
Incremental Delay, d2	1.2	0.2	0.3	0.0	1.8	0.1
Delay (s)	48.3	0.5	2.7	0.5	56.0	53.5
Level of Service	D	A	A	A	E	D
Approach Delay (s)		2.0	2.7		54.7	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	3.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		0.97	0.95		1.00	0.95	
Frt	1.00	0.87		1.00	0.96		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1630		1770	1782		3433	3503		1770	3503	
Flt Permitted	0.74	1.00		0.67	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1373	1630		1252	1782		3433	3503		1770	3503	
Volume (vph)	8	20	102	35	20	8	151	650	47	10	140	10
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	22	111	38	22	9	164	707	51	11	152	11
RTOR Reduction (vph)	0	98	0	0	8	0	0	5	0	0	5	0
Lane Group Flow (vph)	9	35	0	38	23	0	164	753	0	11	158	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	6.5	6.5		6.5	6.5		6.8	34.9		1.3	29.4	
Effective Green, g (s)	6.5	6.5		6.5	6.5		6.8	34.9		1.3	29.4	
Actuated g/C Ratio	0.12	0.12		0.12	0.12		0.12	0.64		0.02	0.54	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	163	194		149	212		427	2235		42	1883	
v/s Ratio Prot		0.02			0.01		c0.05	c0.21		0.01	0.05	
v/s Ratio Perm	0.01			c0.03								
v/c Ratio	0.06	0.18		0.26	0.11		0.38	0.34		0.26	0.08	
Uniform Delay, d1	21.4	21.7		21.9	21.5		22.0	4.6		26.2	6.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.5		0.9	0.2		0.6	0.4		3.3	0.1	
Delay (s)	21.5	22.2		22.8	21.7		22.6	5.0		29.5	6.2	
Level of Service	C	C		C	C		C	A		C	A	
Approach Delay (s)		22.1			22.3			8.1			7.7	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	10.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	54.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION     1 Minaker/Wilbur                    Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            20    5   10
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    20 ---  1.0   1.0  1.1  1.1   1.1 ---   10  RIGHT
                                                          STREET NAME:
THRU   280 ---> 2.1  (NO. OF LANES)   2.1<---  776  THRU  Wilbur

RIGHT   50 ---  1.1   1.1  1.1  1.0   1.0 ---   30  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 150    5   20                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Minaker
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME      VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      20          0 *     1650     0.0000
    THRU (T)        5          5       1650     0.0030
    LEFT (L)      150        150       1650     0.0909     0.0909
    T + L                    155       1650     0.0939
------------------------------------------------------------------------
SB  RIGHT (R)      20          0 *     1650     0.0000
    THRU (T)        5          5       1650     0.0030
    LEFT (L)       10         10       1650     0.0061
    T + L                     15       1650     0.0091     0.0091
------------------------------------------------------------------------
EB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)      280        280       3300     0.0848
    LEFT (L)       20         20       1650     0.0121     0.0121
    T + R                    330       3300     0.1000
------------------------------------------------------------------------
WB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      776        776       3300     0.2352
    LEFT (L)       30         30       1650     0.0182
    T + R                    786       3300     0.2382     0.2382
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.35
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION     6 Hillcrest/18th St                 Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            60   90   50
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    20 ---  1.0   1.0  1.0  1.0   1.1 ---   50  RIGHT
                                                          STREET NAME:
THRU   320 ---> 2.1  (NO. OF LANES)   2.1<---  466  THRU  18th St

RIGHT   90 ---  1.1   1.0  1.0  1.0   1.0 ---  226  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 230  100  240                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Hillcrest
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME      VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     240         14 *     1650     0.0085
    THRU (T)      100        100       1650     0.0606
    LEFT (L)      230        230       1650     0.1394     0.1394
------------------------------------------------------------------------
SB  RIGHT (R)      60         40 *     1650     0.0242
    THRU (T)       90         90       1650     0.0545     0.0545
    LEFT (L)       50         50       1650     0.0303
------------------------------------------------------------------------
EB  RIGHT (R)      90         90       1650     0.0545
    THRU (T)      320        320       3300     0.0970
    LEFT (L)       20         20       1650     0.0121
    T + R                    410       3300     0.1242     0.1242
------------------------------------------------------------------------
WB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)      466        466       3300     0.1412
    LEFT (L)      226        226       1650     0.1370     0.1370
    T + R                    516       3300     0.1564
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.46
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION     7 Viera/18th St                     Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       2-PHASE SIGNAL
-----------            80   20   38
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   110 ---  1.0   1.1  1.1  1.1   1.1 ---  186  RIGHT
                                                          STREET NAME:
THRU   365 ---> 2.0  (NO. OF LANES)   2.1<---  527  THRU  18th St

RIGHT   60 ---  1.0   1.1  1.1  1.0   1.0 ---   20  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 150   30   40                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Viera
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME      VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      40         20 *     1800     0.0111
    THRU (T)       30         30       1800     0.0167
    LEFT (L)      150        150       1800     0.0833     0.0833
    T + L                    180       1800     0.1000
------------------------------------------------------------------------
SB  RIGHT (R)      80         80       1800     0.0444
    THRU (T)       20         20       1800     0.0111
    LEFT (L)       38         38       1800     0.0211
    T + R                    100       1800     0.0556
    T + L                     58       1800     0.0322
    T + R + L                138       1800     0.0767     0.0767
------------------------------------------------------------------------
EB  RIGHT (R)      60          0 *     1800     0.0000
    THRU (T)      365        365       3600     0.1014
    LEFT (L)      110        110       1800     0.0611     0.0611
------------------------------------------------------------------------
WB  RIGHT (R)     186        186       1800     0.1033
    THRU (T)      527        527       3600     0.1464
    LEFT (L)       20         20       1800     0.0111
    T + R                    713       3600     0.1981     0.1981
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.42
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION     8 Phillips Lane/18th Street         Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------            50   10   40
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    80 ---  1.0   1.1  1.1  2.0   1.0 ---   70  RIGHT
                                                          STREET NAME:
THRU   390 ---> 2.1  (NO. OF LANES)   2.0<---  697  THRU  18th Street

RIGHT   10 ---  1.1   1.0  1.1  1.1   1.0 ---   20  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  20   10   20                         Urb=N, Rur=B
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Phillips Lane
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME      VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)       10         10       1650     0.0061
    LEFT (L)       20         20       1650     0.0121
    T + R                     30       1650     0.0182     0.0182
------------------------------------------------------------------------
SB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)       10         10       1650     0.0061
    LEFT (L)       40         40       3000     0.0133
    T + R                     60       1650     0.0364     0.0364
------------------------------------------------------------------------
EB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      390        390       3300     0.1182
    LEFT (L)       80         80       1650     0.0485     0.0485
    T + R                    400       3300     0.1212
------------------------------------------------------------------------
WB  RIGHT (R)      70         48 *     1650     0.0291
    THRU (T)      697        697       3300     0.2112     0.2112
    LEFT (L)       20         20       1650     0.0121
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.31
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION     9 SR 160 SB Ramp/Main Street        Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            30   20   40
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    10 ---  1.0   1.1  1.1  1.0   1.0 ---   90  RIGHT
                                                          STREET NAME:
THRU   380 ---> 2.1  (NO. OF LANES)   2.0<---  647  THRU  Main Street

RIGHT   50 ---  1.1   1.1  1.1  1.9   2.0 --- 1107  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 120   10  148                         Urb=Y, Rur=Y
  S                   LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 SB Ramp
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     148        148       1650     0.0897
    THRU (T)       10         10       1650     0.0061
    LEFT (L)      120        120       1650     0.0727     0.0727
    T + L                    130       1650     0.0788
------------------------------------------------------------------------
SB  RIGHT (R)      30         30       1650     0.0182
    THRU (T)       20         20       1650     0.0121
    LEFT (L)       40         40       1650     0.0242
    T + R                     50       1650     0.0303     0.0303
------------------------------------------------------------------------
EB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)      380        380       3300     0.1152
    LEFT (L)       10         10       1650     0.0061
    T + R                    430       3300     0.1303     0.1303
------------------------------------------------------------------------
WB  RIGHT (R)      90         50 *     1650     0.0303
    THRU (T)      647        647       3300     0.1961
    LEFT (L)     1107       1107       3000     0.3690     0.3690
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.60
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION    10 SR 160 NB Ramp/Main Street        Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0    0    0
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  RIGHT
                                                          STREET NAME:
THRU   488 ---> 3.1  (NO. OF LANES)   3.0<--- 1664  THRU  Main Street

RIGHT   80 ---  1.1   1.0  0.0  2.5   1.0 ---  106  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 180    0 1288                         Urb=Y, Rur=Y
  S                   LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 NB Ramp
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)    1288       1095 *     3127     0.3502     0.3502
    LEFT (L)      180        180       1720     0.1047
------------------------------------------------------------------------
EB  RIGHT (R)      80         80       1720     0.0465
    THRU (T)      488        488       5160     0.0946
    T + R                    568       5160     0.1101
------------------------------------------------------------------------
WB  THRU (T)     1664       1664       5160     0.3225     0.3225
    LEFT (L)      106        106       1720     0.0616
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.67
     INTERSECTION LEVEL OF SERVICE:                             B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION    11 Neroly/Main Street                Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------           141  126  108
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   253 ---  1.0   1.0  1.0  2.0   1.0 ---  357  RIGHT
                                                          STREET NAME:
THRU  1303 ---> 3.1  (NO. OF LANES)   3.0<--- 1369  THRU  Main Street

RIGHT  220 ---  1.1   2.0  1.1  1.1   1.0 ---   50  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 260  129   40                         Urb=Y, Rur=Y
  S                   LEFT THRU RIGHT Split? Y

               STREET NAME: Neroly
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      40         40       1650     0.0242
    THRU (T)      129        129       1650     0.0782
    LEFT (L)      260        260       3000     0.0867
    T + R                    169       1650     0.1024     0.1024
------------------------------------------------------------------------
SB  RIGHT (R)     141          0 *     1650     0.0000
    THRU (T)      126        126       1650     0.0764     0.0764
    LEFT (L)      108        108       3000     0.0360
------------------------------------------------------------------------
EB  RIGHT (R)     220        220       1650     0.1333
    THRU (T)     1303       1303       4950     0.2632
    LEFT (L)      253        253       1650     0.1533     0.1533
    T + R                   1523       4950     0.3077
------------------------------------------------------------------------
WB  RIGHT (R)     357        298 *     1650     0.1806
    THRU (T)     1369       1369       4950     0.2766     0.2766
    LEFT (L)       50         50       1650     0.0303
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.61
     INTERSECTION LEVEL OF SERVICE:                             B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION    12 Sandy/Main Street                 Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            55    6   56
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    67 ---  1.0   1.1  1.1  1.0   1.1 ---   55  RIGHT
                                                          STREET NAME:
THRU  1325 ---> 3.1  (NO. OF LANES)   3.1<--- 1701  THRU  Main Street

RIGHT   60 ---  1.1   1.0  1.0  1.0   1.0 ---   50  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  20    7   50                         Urb=N, Rur=Y
  S                   LEFT THRU RIGHT Split? N

               STREET NAME: Sandy
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      50          0 *     1650     0.0000
    THRU (T)        7          7       1650     0.0042
    LEFT (L)       20         20       1650     0.0121     0.0121
------------------------------------------------------------------------
SB  RIGHT (R)      55         55       1650     0.0333
    THRU (T)        6          6       1650     0.0036
    LEFT (L)       56         56       1650     0.0339
    T + R                     61       1650     0.0370     0.0370
------------------------------------------------------------------------
EB  RIGHT (R)      60         60       1650     0.0364
    THRU (T)     1325       1325       4950     0.2677
    LEFT (L)       67         67       1650     0.0406     0.0406
    T + R                   1385       4950     0.2798
------------------------------------------------------------------------
WB  RIGHT (R)      55         55       1650     0.0333
    THRU (T)     1701       1701       4950     0.3436
    LEFT (L)       50         50       1650     0.0303
    T + R                   1756       4950     0.3547     0.3547
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.44
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION    13 Live Oak/Main Street              Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            51  119  108
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   212 ---  1.0   1.1  2.1  2.0   1.1 ---  310  RIGHT
                                                          STREET NAME:
THRU  1093 ---> 3.0  (NO. OF LANES)   3.1<--- 1627  THRU  Main Street

RIGHT  132 ---  1.0   1.0  2.1  1.1   1.0 ---   55  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 146  326   55                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      55         55       1650     0.0333
    THRU (T)      326        326       3300     0.0988
    LEFT (L)      146        146       1650     0.0885
    T + R                    381       3300     0.1155    0.1155
------------------------------------------------------------------------
SB  RIGHT (R)      51         51       1650     0.0309
    THRU (T)      119        119       3300     0.0361
    LEFT (L)      108        108       3000     0.0360    0.0360
    T + R                    170       3300     0.0515
------------------------------------------------------------------------
EB  RIGHT (R)     132          0 *     1650     0.0000
    THRU (T)     1093       1093       4950     0.2208
    LEFT (L)      212        212       1650     0.1285    0.1285
------------------------------------------------------------------------
WB  RIGHT (R)     310        310       1650     0.1879
    THRU (T)     1627       1627       4950     0.3287
    LEFT (L)       55         55       1650     0.0333
    T + R                   1937       4950     0.3913    0.3913
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.67
     INTERSECTION LEVEL OF SERVICE:                             B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION    14 Big Break/Main Street             Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------           178   40  100
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   201 ---  1.0   1.0  1.1  1.1   1.0 ---   80  RIGHT
                                                          STREET NAME:
THRU   988 ---> 2.0  (NO. OF LANES)   2.0<--- 1748  THRU  Main Street

RIGHT   60 ---  1.0   1.0  1.1  1.1   1.0 ---   60  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  90   20   20                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Big Break
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)       20         20       1650     0.0121
    LEFT (L)       90         90       1650     0.0545    0.0545
    T + R                     40       1650     0.0242
------------------------------------------------------------------------
SB  RIGHT (R)     178          0 *     1650     0.0000
    THRU (T)       40         40       1650     0.0242
    LEFT (L)      100        100       1650     0.0606
    T + L                    140       1650     0.0848    0.0848
------------------------------------------------------------------------
EB  RIGHT (R)      60          0 *     1650     0.0000
    THRU (T)      988        988       3300     0.2994
    LEFT (L)      201        201       1650     0.1218    0.1218
------------------------------------------------------------------------
WB  RIGHT (R)      80          0 *     1650     0.0000
    THRU (T)     1748       1748       3300     0.5297    0.5297
    LEFT (L)       60         60       1650     0.0364
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.79
     INTERSECTION LEVEL OF SERVICE:                             C
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION    17 Empire Ave/Oakley Road            Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------           110  325   50
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? Y
LEFT   140 ---  2.1   1.0  1.0  1.0   1.0 ---   20  RIGHT
                                                          STREET NAME:
THRU    10 ---> 1.1  (NO. OF LANES)   1.1<---   10  THRU  Oakley Road

RIGHT  229 ---  1.0   1.0  2.1  1.1   1.1 ---   20  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 428  584   20                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire Ave
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)      584        584       3300     0.1770
    LEFT (L)      428        428       1650     0.2594    0.2594
    T + R                    604       3300     0.1830
------------------------------------------------------------------------
SB  RIGHT (R)     110         33 *     1650     0.0200
    THRU (T)      325        325       1650     0.1970    0.1970
    LEFT (L)       50         50       1650     0.0303
------------------------------------------------------------------------
EB  RIGHT (R)     229          0 *     1650     0.0000
    THRU (T)       10         10       1650     0.0061
    LEFT (L)      140        140       3000     0.0467
    T + L                    150       3000     0.0500    0.0500
------------------------------------------------------------------------
WB  RIGHT (R)      20          0 *     1650     0.0000
    THRU (T)       10         10       1650     0.0061
    LEFT (L)       20         20       1650     0.0121
    T + L                     30       1650     0.0182    0.0182
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.52
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION    18 Empire Avenue/Main Street         Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------            50   40   20
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    20 ---  1.0   1.0  1.1  1.1   1.1 ---   20  RIGHT
                                                          STREET NAME:
THRU   813 ---> 2.0  (NO. OF LANES)   2.1<--- 1345  THRU  Main Street

RIGHT  235 ---  1.0   2.0  1.0  1.0   1.0 ---  210  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 524   20  200                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Empire Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     200          0 *     1650     0.0000
    THRU (T)       20         20       1650     0.0121
    LEFT (L)      524        524       3000     0.1747    0.1747
------------------------------------------------------------------------
SB  RIGHT (R)      50         30 *     1650     0.0182
    THRU (T)       40         40       1650     0.0242
    LEFT (L)       20         20       1650     0.0121
    T + L                     60       1650     0.0364    0.0364
------------------------------------------------------------------------
EB  RIGHT (R)     235          0 *     1650     0.0000
    THRU (T)      813        813       3300     0.2464
    LEFT (L)       20         20       1650     0.0121    0.0121
------------------------------------------------------------------------
WB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)     1345       1345       3300     0.4076
    LEFT (L)      210        210       1650     0.1273
    T + R                   1365       3300     0.4136    0.4136
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.64
     INTERSECTION LEVEL OF SERVICE:                             B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION    19 Vintage/Main Street               Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------            37    0   60
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    97 ---  1.0   1.0  0.0  1.0   1.1 ---   40  RIGHT
                                                          STREET NAME:
THRU   506 ---> 2.0  (NO. OF LANES)   2.1<---  608  THRU  Main Street

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=N, Rur=B
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Vintage
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*  CAPACITY    RATIO        V/C
------------------------------------------------------------------------
SB  RIGHT (R)      37          0 *     1720     0.0000
    LEFT (L)       60         60       1720     0.0349     0.0349
------------------------------------------------------------------------
EB  THRU (T)      506        506       3440     0.1471
    LEFT (L)       97         97       1720     0.0564     0.0564
------------------------------------------------------------------------
WB  RIGHT (R)      40         40       1720     0.0233
    THRU (T)      608        608       3440     0.1767
    T + R                    648       3440     0.1884     0.1884
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.28
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION    20 O'Hara Avenue/Main Street         Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            10   90   20
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    10 ---  1.0   1.1  1.1  1.1   1.1 ---   20  RIGHT
                                                          STREET NAME:
THRU   492 ---> 1.0  (NO. OF LANES)   1.1<---  551  THRU  Main Street

RIGHT  104 ---  1.0   1.0  1.1  1.1   1.0 ---   40  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  137   40   60                        Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: O'Hara Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*  CAPACITY    RATIO        V/C
------------------------------------------------------------------------
NB  RIGHT (R)      60         60       1650     0.0364
    THRU (T)       40         40       1650     0.0242
    LEFT (L)      137        137       1650     0.0830     0.0830
    T + R                    100       1650     0.0606
------------------------------------------------------------------------
SB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)       90         90       1650     0.0545
    LEFT (L)       20         20       1650     0.0121
    T + R                    100       1650     0.0606
    T + L                    110       1650     0.0667
    T + R + L                120       1650     0.0727     0.0727
------------------------------------------------------------------------
EB  RIGHT (R)     104          0 *     1650     0.0000
    THRU (T)      492        492       1650     0.2982
    LEFT (L)       10         10       1650     0.0061     0.0061
------------------------------------------------------------------------
WB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)      551        551       1650     0.3339
    LEFT (L)       40         40       1650     0.0242
    T + R                    571       1650     0.3461     0.3461
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.51
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION    21 Empire Avenue/Cypress Road        Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0  468  156
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  2.0  1.0   1.0 ---  255  RIGHT
                                                          STREET NAME:
THRU     0 ---> 0.0  (NO. OF LANES)   0.0<---    0  THRU  Cypress Road

RIGHT    0 ---  0.0   0.0  2.1  1.1   1.0 ---  210  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0  827  120                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*  CAPACITY    RATIO        V/C
------------------------------------------------------------------------
NB  RIGHT (R)     120        120       1720     0.0698
    THRU (T)      827        827       3440     0.2404
    T + R                    947       3440     0.2753     0.2753
------------------------------------------------------------------------
SB  THRU (T)      468        468       3440     0.1360
    LEFT (L)      156        156       1720     0.0907     0.0907
------------------------------------------------------------------------
WB  RIGHT (R)     255         99 *     1720     0.0576
    LEFT (L)      210        210       1720     0.1221     0.1221
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.49
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION    22 Main Street/Cypress               Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            10  506  426
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    40 ---  1.0   1.1  2.1  2.0   2.6 --- 1100  RIGHT
                                                          STREET NAME:
THRU   196 ---> 2.1  (NO. OF LANES)   1.1<---  290  THRU  Cypress

RIGHT   50 ---  1.1   1.0  2.0  1.5   1.0 ---  380  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  90  591  220                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Main Street
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*  CAPACITY    RATIO        V/C
------------------------------------------------------------------------
NB  RIGHT (R)     220          0 *     1650     0.0000
    THRU (T)      591        591       3300     0.1791     0.1791
    LEFT (L)       90         90       1650     0.0545
------------------------------------------------------------------------
SB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      506        506       3300     0.1533
    LEFT (L)      426        426       3000     0.1420     0.1420
    T + R                    516       3300     0.1564
------------------------------------------------------------------------
EB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)      196        196       3300     0.0594
    LEFT (L)       40         40       1650     0.0242     0.0242
    T + R                    246       3300     0.0745
------------------------------------------------------------------------
WB  RIGHT (R)    1100        866 *     3000     0.2887
    THRU (T)      290        290       1650     0.1758
    LEFT (L)      380        380       1650     0.2303
    T + R                   1156       3000     0.3853     0.3853
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.73
     INTERSECTION LEVEL OF SERVICE:                             C
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION    24 Live Oak/Laurel                   Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------           335    0   72
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   317 ---  2.0   1.0  0.0  1.0   1.1 ---  135  RIGHT
                                                          STREET NAME:
THRU  1026 ---> 3.0  (NO. OF LANES)   3.1<--- 1836  THRU  Laurel

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)      335        161 *    1720     0.0936     0.0936
    LEFT (L)        72         72      1720     0.0419
------------------------------------------------------------------------
EB  THRU (T)      1026       1026      5160     0.1988
    LEFT (L)       317        317      3127     0.1014     0.1014
------------------------------------------------------------------------
WB  RIGHT (R)      135        135      1720     0.0785
    THRU (T)      1836       1836      5160     0.3558
    T + R                    1971      5160     0.3820     0.3820
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.58
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION    25 Empire/Laurel                     Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------           420  258   51
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   220 ---  1.0   1.1  2.1  1.0   1.1 ---  261  RIGHT
                                                          STREET NAME:
THRU   728 ---> 2.1  (NO. OF LANES)   2.1<--- 1371  THRU  Laurel

RIGHT  150 ---  1.1   1.0  2.1  1.1   1.0 ---   60  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 180  496   50                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)       50         50      1650     0.0303
    THRU (T)       496        496      3300     0.1503
    LEFT (L)       180        180      1650     0.1091     0.1091
    T + R                     546      3300     0.1655
------------------------------------------------------------------------
SB  RIGHT (R)      420        420      1650     0.2545     0.2545
    THRU (T)       258        258      3300     0.0782
    LEFT (L)        51         51      1650     0.0309
    T + R                     678      3300     0.2055
------------------------------------------------------------------------
EB  RIGHT (R)      150        150      1650     0.0909
    THRU (T)       728        728      3300     0.2206
    LEFT (L)       220        220      1650     0.1333     0.1333
    T + R                     878      3300     0.2661
------------------------------------------------------------------------
WB  RIGHT (R)      261        261      1650     0.1582
    THRU (T)      1371       1371      3300     0.4155
    LEFT (L)        60         60      1650     0.0364
    T + R                    1632      3300     0.4945     0.4945
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.99
     INTERSECTION LEVEL OF SERVICE:                             E
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION    26 Bridgehead/Proj Dwy #1            Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0  298   38
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  1.0  1.0   1.0 ---   31  RIGHT
                                                          STREET NAME:
THRU     0 ---> 0.0  (NO. OF LANES)   0.0<---    0  THRU  Proj Dwy #1

RIGHT    0 ---  0.0   0.0  1.0  1.0   1.0 ---   76  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0  647   92                         Urb=N, Rur=N
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Bridgehead
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)       92         16 *    1720     0.0093
    THRU (T)       647        647      1720     0.3762     0.3762
------------------------------------------------------------------------
SB  THRU (T)       298        298      1720     0.1733
    LEFT (L)        38         38      1720     0.0221     0.0221
------------------------------------------------------------------------
WB  RIGHT (R)       31          0 *    1720     0.0000
    LEFT (L)        76         76      1720     0.0442     0.0442
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.44
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION    27 Proj Dwy Center/Main Street       Oakley
Count Date                   Time                Peak Hour
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------            41    0   56
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    51 ---  1.0   1.0  0.0  1.0   1.0 ---   58  RIGHT
                                                          STREET NAME:
THRU  1380 ---> 3.0  (NO. OF LANES)   3.0<--- 1766  THRU  Main Street

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=N, Rur=B
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Proj Dwy Center
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)       41          0 *    1720     0.0000
    LEFT (L)        56         56      1720     0.0326     0.0326
------------------------------------------------------------------------
EB  THRU (T)      1380       1380      5160     0.2674
    LEFT (L)        51         51      1720     0.0297     0.0297
------------------------------------------------------------------------
WB  RIGHT (R)       58          2 *    1720     0.0012
    THRU (T)      1766       1766      5160     0.3422     0.3422
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.40
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION    28 Proj Dwy East/Main Street         Oakley
Count Date                   Time                Peak Hour
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------            35    0   30
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    38 ---  1.0   1.0  0.0  1.0   1.0 ---   38  RIGHT
                                                          STREET NAME:
THRU  1218 ---> 3.0  (NO. OF LANES)   3.0<--- 1967  THRU  Main Street

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=N, Rur=N
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Proj Dwy East
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)      35          0 *     1720     0.0000
    LEFT (L)       30         30       1720     0.0174     0.0174
------------------------------------------------------------------------
EB  THRU (T)     1218       1218       5160     0.2360
    LEFT (L)       38         38       1720     0.0221     0.0221
------------------------------------------------------------------------
WB  RIGHT (R)      38          8 *     1720     0.0047
    THRU (T)     1967       1967       5160     0.3812     0.3812
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.42
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION    29 Proj Dwy/Live Oak Ave             Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            10  140   10
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     8 ---  1.0   1.1  2.1  1.0   1.1 ---    8  RIGHT
                                                          STREET NAME:
THRU    20 ---> 1.1  (NO. OF LANES)   1.1<---   20  THRU  Live Oak Ave

RIGHT  102 ---  1.1   2.0  2.1  1.1   1.0 ---   35  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 151  650   47                         Urb=N, Rur=B
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Proj Dwy
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      47         47       1650     0.0285
    THRU (T)      650        650       3300     0.1970
    LEFT (L)      151        151       3000     0.0503
    T + R                    697       3300     0.2112     0.2112
------------------------------------------------------------------------
SB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      140        140       3300     0.0424
    LEFT (L)       10         10       1650     0.0061     0.0061
    T + R                    150       3300     0.0455
------------------------------------------------------------------------
EB  RIGHT (R)     102        102       1650     0.0618
    THRU (T)       20         20       1650     0.0121
    LEFT (L)        8          8       1650     0.0048
    T + R                    122       1650     0.0739     0.0739
------------------------------------------------------------------------
WB  RIGHT (R)       8          8       1650     0.0048
    THRU (T)       20         20       1650     0.0121
    LEFT (L)       35         35       1650     0.0212     0.0212
    T + R                     28       1650     0.0170
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.31
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

Cumulative (2030) With Project PM

HCM Signalized Intersection Capacity Analysis
1: Wilbur Avenue & Minaker Drive

2030 PM & Proj with Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↰	↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	0.97		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (prot)	1770	3439		1770	3527			1770	1583		1817	1583
Flt Permitted	0.95	1.00		0.95	1.00			0.74	1.00		0.86	1.00
Satd. Flow (perm)	1770	3439		1770	3527			1384	1583		1605	1583
Volume (vph)	10	821	190	50	461	10	70	0	60	10	10	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	864	200	53	485	11	74	0	63	11	11	21
RTOR Reduction (vph)	0	23	0	0	2	0	0	0	54	0	0	18
Lane Group Flow (vph)	11	1041	0	53	494	0	0	74	9	0	22	3
Turn Type	Prot			Prot			Perm		Perm	Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		4
Actuated Green, G (s)	0.9	40.5		2.8	42.4			9.1	9.1		9.1	9.1
Effective Green, g (s)	0.9	40.5		2.8	42.4			9.1	9.1		9.1	9.1
Actuated g/C Ratio	0.01	0.63		0.04	0.66			0.14	0.14		0.14	0.14
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	25	2163		77	2322			196	224		227	224
v/s Ratio Prot	0.01	c0.30		c0.03	0.14							
v/s Ratio Perm								c0.05	0.01		0.01	0.00
v/c Ratio	0.44	0.48		0.69	0.21			0.38	0.04		0.10	0.01
Uniform Delay, d1	31.5	6.4		30.4	4.4			25.1	23.9		24.1	23.8
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	11.9	0.2		22.6	0.0			1.2	0.1		0.2	0.0
Delay (s)	43.4	6.5		53.0	4.4			26.3	24.0		24.3	23.8
Level of Service	D	A		D	A			C	C		C	C
Approach Delay (s)		6.9			9.1			25.2			24.0	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	9.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	64.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
2: Wilbur Avenue & Viera Avenue

2030 PM & Proj with Ramps
11/6/2006

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱		↰	↑	↰↱	
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	799	130	39	509	50	39
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	841	137	41	536	53	41
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			978		1527	909
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			978		1527	909
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			94		57	88
cM capacity (veh/h)			706		122	333

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	978	41	536	94
Volume Left	0	41	0	53
Volume Right	137	0	0	41
cSH	1700	706	1700	169
Volume to Capacity	0.58	0.06	0.32	0.56
Queue Length 95th (ft)	0	5	0	72
Control Delay (s)	0.0	10.4	0.0	50.2
Lane LOS		B		F
Approach Delay (s)	0.0	0.7		50.2
Approach LOS				F

Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
3: Wilbur Avenue & SR 160 SB Off

2030 PM & Proj with Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱		↰	↑↑					↰		↱
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	658	190	160	468	0	0	0	0	266	0	90
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	693	200	168	493	0	0	0	0	280	0	95
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	493			893			1376	1622	793	1622	1722	246
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	493			893			1376	1622	793	1622	1722	246
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			78			100	100	100	0	100	87
cM capacity (veh/h)	1067			755			76	79	332	57	69	754

Direction, Lane #	EB 1	WB 1	WB 2	WB 3	SB 1	SB 2
Volume Total	893	168	246	246	280	95
Volume Left	0	168	0	0	280	0
Volume Right	200	0	0	0	0	95
cSH	1700	755	1700	1700	57	754
Volume to Capacity	0.53	0.22	0.14	0.14	4.95	0.13
Queue Length 95th (ft)	0	21	0	0	Err	11
Control Delay (s)	0.0	11.1	0.0	0.0	Err	10.5
Lane LOS		B			F	B
Approach Delay (s)	0.0	2.8			7473.8	
Approach LOS					F	

Intersection Summary			
Average Delay	1453.3		
Intersection Capacity Utilization	79.8%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
4: Wilbur Avenue & SR 160 NB On

2030 PM & Proj with Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑			↑↱		↰		↱			
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	330	594	0	0	578	107	50	0	120	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	347	625	0	0	608	113	53	0	126	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	721			625			1624	2041	313	1672	1985	361
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	721			625			1624	2041	313	1672	1985	361
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	60			100			0	100	82	100	100	100
cM capacity (veh/h)	877			952			47	34	683	35	37	636

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2
Volume Total	347	313	313	406	315	53	126
Volume Left	347	0	0	0	0	53	0
Volume Right	0	0	0	0	113	0	126
cSH	877	1700	1700	1700	1700	47	683
Volume to Capacity	0.40	0.18	0.18	0.24	0.19	1.12	0.18
Queue Length 95th (ft)	48	0	0	0	0	120	17
Control Delay (s)	11.8	0.0	0.0	0.0	0.0	306.9	11.5
Lane LOS	B					F	B
Approach Delay (s)	4.2			0.0		98.4	
Approach LOS						F	

Intersection Summary			
Average Delay	11.6		
Intersection Capacity Utilization	79.8%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
5: Wilbur Avenue & Bridgehead Road

2030 PM & Proj with Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	30	409	275	30	439	10	196	50	50	10	30	50
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	431	289	32	462	11	206	53	53	11	32	53

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1
Volume Total (vph)	32	720	504	312	95
Volume Left (vph)	32	0	32	206	11
Volume Right (vph)	0	289	11	53	53
Hadj (s)	0.53	-0.25	0.03	0.07	-0.28
Departure Headway (s)	7.8	7.0	6.9	7.5	8.3
Degree Utilization, x	0.07	1.40	0.96	0.65	0.22
Capacity (veh/h)	450	516	517	462	405
Control Delay (s)	10.2	210.3	56.3	23.5	13.6
Approach Delay (s)	201.9		56.3	23.5	13.6
Approach LOS	F		F	C	B

Intersection Summary			
Delay	113.5		
HCM Level of Service	F		
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
6: E 18th Street & Hillcrest Avenue

2030 PM & Proj with Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↱		↰	↑	↱	↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3439		1770	3503		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3439		1770	3503		1770	1863	1583	1770	1863	1583
Volume (vph)	70	991	230	301	551	40	190	210	321	80	140	40
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	1043	242	317	580	42	200	221	338	84	147	42
RTOR Reduction (vph)	0	16	0	0	4	0	0	0	139	0	0	35
Lane Group Flow (vph)	74	1269	0	317	618	0	200	221	199	84	147	7
Turn Type	Prot			Prot			Split		Perm	Split		Perm
Protected Phases	1	6		5	2		8	8		4	4	
Permitted Phases									8			4
Actuated Green, G (s)	6.8	43.4		21.1	57.7		16.6	16.6	16.6	13.8	13.8	13.8
Effective Green, g (s)	7.8	45.4		22.1	59.7		18.1	18.1	18.1	15.3	15.3	15.3
Actuated g/C Ratio	0.07	0.40		0.20	0.53		0.16	0.16	0.16	0.14	0.14	0.14
Clearance Time (s)	4.0	5.0		4.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	122	1383		346	1852		284	299	254	240	252	215
v/s Ratio Prot	0.04	c0.37		c0.18	0.18		0.11	0.12		0.05	c0.08	
v/s Ratio Perm									c0.13			0.00
v/c Ratio	0.61	0.92		0.92	0.33		0.70	0.74	0.78	0.35	0.58	0.03
Uniform Delay, d1	51.1	32.0		44.5	15.2		44.9	45.2	45.5	44.3	45.8	42.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.3	9.8		28.0	0.1		7.7	9.2	14.4	0.9	3.4	0.1
Delay (s)	59.3	41.8		72.4	15.3		52.6	54.4	59.9	45.2	49.2	42.4
Level of Service	E	D		E	B		D	D	E	D	D	D
Approach Delay (s)		42.7			34.6			56.4			46.9	
Approach LOS		D			C			E			D	

Intersection Summary			
HCM Average Control Delay	43.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	112.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
7: E 18th Street & Viera Avenue

2030 PM & Proj with Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑↱			↰↑	↱		✥	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	0.98			1.00	0.85		0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00		0.99	
Satd. Flow (prot)	1770	3539	1583	1770	3476			1788	1583		1720	
Flt Permitted	0.29	1.00	1.00	0.18	1.00			0.57	1.00		0.88	
Satd. Flow (perm)	537	3539	1583	344	3476			1069	1583		1537	
Volume (vph)	120	1073	190	30	704	96	100	20	20	86	80	150
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	126	1129	200	32	741	101	105	21	21	91	84	158
RTOR Reduction (vph)	0	0	87	0	17	0	0	0	15	0	60	0
Lane Group Flow (vph)	126	1129	113	32	825	0	0	126	6	0	273	0
Turn Type	Perm		Perm	Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	24.8	24.8	24.8	24.8	24.8			12.6	12.6		12.6	
Effective Green, g (s)	26.8	26.8	26.8	26.8	26.8			14.6	14.6		14.6	
Actuated g/C Ratio	0.57	0.57	0.57	0.57	0.57			0.31	0.31		0.31	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	304	2001	895	194	1965			329	488		473	
v/s Ratio Prot		c0.32			0.24							
v/s Ratio Perm	0.23		0.07	0.09				0.12	0.00		c0.18	
v/c Ratio	0.41	0.56	0.13	0.16	0.42			0.38	0.01		0.58	
Uniform Delay, d1	5.8	6.6	4.8	4.9	5.9			12.9	11.4		13.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.9	0.4	0.1	0.4	0.1			0.7	0.0		1.7	
Delay (s)	6.8	6.9	4.9	5.3	6.0			13.6	11.4		15.5	
Level of Service	A	A	A	A	A			B	B		B	
Approach Delay (s)		6.6			6.0			13.3			15.5	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	7.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	47.4	Sum of lost time (s)	6.0
Intersection Capacity Utilization	67.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: E 18th Street & Phillips Lane

2030 PM & Proj with Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑	↱	↰	↑↱		↰↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.97	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.88		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3528		1770	3539	1583	1770	1631		3433	1592	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3528		1770	3539	1583	1770	1631		3433	1592	
Volume (vph)	280	924	20	20	556	230	20	10	50	250	10	310
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	295	973	21	21	585	242	21	11	53	263	11	326
RTOR Reduction (vph)	0	2	0	0	0	173	0	44	0	0	245	0
Lane Group Flow (vph)	295	992	0	21	585	69	21	20	0	263	92	0
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	5	2		1	6		4	7		8	3	
Permitted Phases						6						
Actuated Green, G (s)	13.4	31.2		0.7	18.5	18.5	1.0	11.0		6.1	16.1	
Effective Green, g (s)	13.4	31.2		0.7	18.5	18.5	1.0	11.0		6.1	16.1	
Actuated g/C Ratio	0.21	0.48		0.01	0.28	0.28	0.02	0.17		0.09	0.25	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	365	1693		19	1007	451	27	276		322	394	
v/s Ratio Prot	c0.17	c0.28		0.01	0.17		0.01	0.01		c0.08	c0.06	
v/s Ratio Perm						0.04						
v/c Ratio	0.81	0.59		1.11	0.58	0.15	0.78	0.07		0.82	0.23	
Uniform Delay, d1	24.6	12.2		32.1	19.9	17.4	31.9	22.7		28.9	19.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	12.4	0.5		242.0	0.9	0.2	81.9	0.1		14.7	0.3	
Delay (s)	36.9	12.8		274.2	20.8	17.5	113.7	22.8		43.6	19.8	
Level of Service	D	B		F	C	B	F	C		D	B	
Approach Delay (s)		18.3			26.1			45.3			30.3	
Approach LOS		B			C			D			C	

Intersection Summary			
HCM Average Control Delay	24.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

9: E 18th Street & SR 160 SB Off

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰↰	↑↑	↱		↰↑	↱	↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85		1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1719	3370		3335	3438	1538		1751	1538	1719	1702	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.77	1.00	0.70	1.00	
Satd. Flow (perm)	1719	3370		3335	3438	1538		1401	1538	1274	1702	
Volume (vph)	30	1044	160	1293	706	100	40	20	155	90	30	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	1099	168	1361	743	105	42	21	163	95	32	21
RTOR Reduction (vph)	0	8	0	0	0	24	0	0	0	0	19	0
Lane Group Flow (vph)	32	1259	0	1361	743	81	0	63	163	95	34	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot		Perm	Perm		Free	Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases						6	8		Free	4		
Actuated Green, G (s)	3.6	53.9		49.6	99.9	99.9		13.5	130.0	13.5	13.5	
Effective Green, g (s)	3.6	54.9		49.6	100.9	100.9		13.5	130.0	13.5	13.5	
Actuated g/C Ratio	0.03	0.42		0.38	0.78	0.78		0.10	1.00	0.10	0.10	
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0		4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	4.0	4.0		2.0		2.0	2.0	
Lane Grp Cap (vph)	48	1423		1272	2668	1194		145	1538	132	177	
v/s Ratio Prot	0.02	c0.37		c0.41	0.22						0.02	
v/s Ratio Perm						0.05		0.04	0.11	c0.07		
v/c Ratio	0.67	0.88		1.07	0.28	0.07		0.43	0.11	0.72	0.19	
Uniform Delay, d1	62.6	34.6		40.2	4.2	3.4		54.7	0.0	56.4	53.3	
Progression Factor	1.00	1.00		0.61	0.69	0.55		1.00	1.00	1.00	1.00	
Incremental Delay, d2	29.8	8.4		44.5	0.2	0.1		0.8	0.1	14.5	0.2	
Delay (s)	92.4	43.0		69.1	3.1	2.0		55.4	0.1	70.9	53.5	
Level of Service	F	D		E	A	A		E	A	E	D	
Approach Delay (s)		44.2			43.7			15.6			64.6	
Approach LOS		D			D			B			E	

Intersection Summary			
HCM Average Control Delay	43.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	92.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

10: Main Street & SR 160 NB On

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑↱		↰	↑↑↑	↰	↱↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		1.00	0.91	1.00	0.88
Frt	0.98		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	4860		1719	4940	1719	2707
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	4860		1719	4940	1719	2707
Volume (vph)	1150	140	215	1909	190	1826
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1211	147	226	2009	200	1922
RTOR Reduction (vph)	12	0	0	0	0	1
Lane Group Flow (vph)	1346	0	226	2009	200	1921
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Turn Type			Prot			pm+ov
Protected Phases	2		1	6	8	1
Permitted Phases						8
Actuated Green, G (s)	35.0		68.0	107.0	14.0	82.0
Effective Green, g (s)	36.0		68.0	108.0	14.0	82.0
Actuated g/C Ratio	0.28		0.52	0.83	0.11	0.63
Clearance Time (s)	5.0		4.0	5.0	4.0	4.0
Vehicle Extension (s)	4.0		3.0	4.0	2.0	3.0
Lane Grp Cap (vph)	1346		899	4104	185	1791
v/s Ratio Prot	c0.28		0.13	0.41	0.12	c0.56
v/s Ratio Perm						0.15
v/c Ratio	1.00		0.25	0.49	1.08	1.07
Uniform Delay, d1	47.0		17.0	3.1	58.0	24.0
Progression Factor	0.65		0.53	0.08	1.00	1.00
Incremental Delay, d2	20.0		0.1	0.3	89.4	43.7
Delay (s)	50.3		9.2	0.5	147.4	67.7
Level of Service	D		A	A	F	E
Approach Delay (s)	50.3			1.4	75.2	
Approach LOS	D			A	E	

Intersection Summary			
HCM Average Control Delay	40.4	HCM Level of Service	D
HCM Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	95.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

11: Main Street & Bridgehead Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑↱		↰	↑↑↑	↱	↰↰	↑↱		↰↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00	0.97	1.00		0.97	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	4826		1719	4940	1538	3335	1710		3335	1810	1538
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1719	4826		1719	4940	1538	3335	1710		3335	1810	1538
Volume (vph)	240	2316	420	80	1649	168	210	139	80	227	119	264
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	253	2438	442	84	1736	177	221	146	84	239	125	278
RTOR Reduction (vph)	0	20	0	0	0	90	0	16	0	0	0	252
Lane Group Flow (vph)	253	2860	0	84	1736	87	221	214	0	239	125	26
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot		Perm	Split			Split		Perm
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases						6						7
Actuated Green, G (s)	22.3	77.0		7.0	61.7	61.7	17.0	17.0		12.0	12.0	12.0
Effective Green, g (s)	22.3	78.0		7.0	62.7	62.7	17.0	17.0		12.0	12.0	12.0
Actuated g/C Ratio	0.17	0.60		0.05	0.48	0.48	0.13	0.13		0.09	0.09	0.09
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	295	2896		93	2383	742	436	224		308	167	142
v/s Ratio Prot	0.15	c0.59		0.05	c0.35		0.07	c0.13		c0.07	0.07	
v/s Ratio Perm						0.06						0.02
v/c Ratio	0.86	0.99		0.90	0.73	0.12	0.51	0.96		0.78	0.75	0.18
Uniform Delay, d1	52.3	25.5		61.2	26.9	18.5	52.6	56.1		57.7	57.5	54.5
Progression Factor	1.03	0.75		0.58	0.26	0.17	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.3	2.9		47.4	1.3	0.2	0.3	47.3		10.6	14.8	0.2
Delay (s)	56.4	22.0		83.1	8.3	3.3	52.9	103.4		68.3	72.3	54.7
Level of Service	E	C		F	A	A	D	F		E	E	D
Approach Delay (s)		24.8			11.0			78.7			63.2	
Approach LOS		C			B			E			E	

Intersection Summary			
HCM Average Control Delay	28.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	94.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

12: Main Street & Sandy Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑↱		↰	↑↑↑↱		↰	↑	↱	↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	4876		1719	4890		1719	1863	1538	1770	1606	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	4876		1719	4890		1719	1863	1538	1770	1606	
Volume (vph)	205	2208	210	40	1615	145	110	15	160	211	15	172
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	216	2324	221	42	1700	153	116	16	168	222	16	181
RTOR Reduction (vph)	0	8	0	0	8	0	0	0	86	0	169	0
Lane Group Flow (vph)	216	2537	0	42	1845	0	116	16	82	222	28	0
Heavy Vehicles (%)	2%	5%	5%	5%	5%	2%	5%	2%	5%	2%	2%	2%
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8			
Actuated Green, G (s)	20.8	77.7		5.5	61.9		21.2	11.4	11.4	18.9	8.6	
Effective Green, g (s)	20.8	78.2		5.5	62.9		21.7	11.4	11.4	18.9	8.6	
Actuated g/C Ratio	0.16	0.60		0.04	0.48		0.17	0.09	0.09	0.15	0.07	
Clearance Time (s)	4.0	4.5		4.0	5.0		4.5	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	283	2933		73	2366		287	163	135	257	106	
v/s Ratio Prot	0.12	c0.52		0.02	c0.38		0.07	0.01		c0.13	0.02	
v/s Ratio Perm									c0.05			
v/c Ratio	0.76	0.86		0.58	0.78		0.40	0.10	0.61	0.86	0.26	
Uniform Delay, d1	52.2	21.5		61.1	27.8		48.4	54.6	57.2	54.3	57.7	
Progression Factor	0.65	0.26		1.05	0.66		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.6	1.1		9.0	2.2		0.9	0.3	7.6	24.6	1.3	
Delay (s)	37.7	6.8		73.3	20.7		49.3	54.8	64.7	78.9	59.0	
Level of Service	D	A		E	C		D	D	E	E	E	
Approach Delay (s)		9.2			21.9			58.2			69.6	
Approach LOS		A			C			E			E	

Intersection Summary			
HCM Average Control Delay	21.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	81.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
13: Main Street & Live Oak Ave

2030 PM & Proj with Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑	↱	↰	↑↑↑↱		↰	↑↱		↰↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91		1.00	0.95		0.97	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.94		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	4940	1538	1719	4815		1719	3270		3433	3367	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	4940	1538	1719	4815		1719	3270		3433	3367	
Volume (vph)	292	2075	250	102	1441	378	173	227	171	387	421	202
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	307	2184	263	107	1517	398	182	239	180	407	443	213
RTOR Reduction (vph)	0	0	100	0	36	0	0	109	0	0	45	0
Lane Group Flow (vph)	307	2184	163	107	1879	0	182	310	0	407	611	0
Heavy Vehicles (%)	2%	5%	5%	5%	5%	2%	5%	2%	5%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2									
Actuated Green, G (s)	23.0	65.0	65.0	11.0	53.0		14.0	16.6		21.4	24.0	
Effective Green, g (s)	23.0	65.0	65.0	11.0	53.0		14.0	16.6		21.4	24.0	
Actuated g/C Ratio	0.18	0.50	0.50	0.08	0.41		0.11	0.13		0.16	0.18	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	313	2470	769	145	1963		185	418		565	622	
v/s Ratio Prot	c0.17	0.44		0.06	c0.39		c0.11	0.09		0.12	c0.18	
v/s Ratio Perm			0.11									
v/c Ratio	0.98	0.88	0.21	0.74	0.96		0.98	0.74		0.72	0.98	
Uniform Delay, d1	53.3	29.1	18.2	58.1	37.4		57.9	54.6		51.5	52.8	
Progression Factor	0.72	0.64	0.72	0.68	0.51		1.00	1.00		1.00	1.00	
Incremental Delay, d2	39.5	4.0	0.5	14.8	10.8		61.0	6.9		4.5	31.5	
Delay (s)	77.6	22.5	13.5	54.5	29.8		118.9	61.6		56.0	84.3	
Level of Service	E	C	B	D	C		F	E		E	F	
Approach Delay (s)		27.8			31.1			78.9			73.4	
Approach LOS		C			C			E			E	

Intersection Summary			
HCM Average Control Delay	41.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	93.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
14: Main Street & Big Break Road

2030 PM & Proj with Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↱			↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.97	1.00
Satd. Flow (prot)	1770	3438	1583	1770	3438	1583	1770	1695			1800	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.51	1.00			0.48	1.00
Satd. Flow (perm)	1770	3438	1583	1770	3438	1583	949	1695			895	1583
Volume (vph)	297	2155	180	90	1546	80	120	60	90	90	40	246
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	313	2268	189	95	1627	84	126	63	95	95	42	259
RTOR Reduction (vph)	0	0	39	0	0	22	0	42	0	0	0	217
Lane Group Flow (vph)	313	2268	150	95	1627	62	126	116	0	0	137	42
Heavy Vehicles (%)	2%	5%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot		custom	Prot		custom	Perm			Perm		Perm
Protected Phases	5			1				3			7	
Permitted Phases		2	2		6	6	3			7		7
Actuated Green, G (s)	25.0	88.1	88.1	8.0	70.1	70.1	20.9	20.9			20.9	20.9
Effective Green, g (s)	26.0	89.1	89.1	8.0	71.1	71.1	20.9	20.9			20.9	20.9
Actuated g/C Ratio	0.20	0.69	0.69	0.06	0.55	0.55	0.16	0.16			0.16	0.16
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	354	2356	1085	109	1880	866	153	273			144	254
v/s Ratio Prot	0.18			0.05				0.07				
v/s Ratio Perm		c0.66	0.09		c0.47	0.04	0.13				c0.15	0.03
v/c Ratio	0.88	0.96	0.14	0.87	0.87	0.07	0.82	0.43			0.95	0.16
Uniform Delay, d1	50.5	18.9	7.1	60.5	25.3	13.9	52.8	49.1			54.0	47.0
Progression Factor	1.29	0.43	0.31	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	17.9	9.8	0.2	47.2	5.6	0.2	28.7	1.1			60.1	0.3
Delay (s)	83.2	18.0	2.4	107.7	31.0	14.0	81.5	50.2			114.1	47.3
Level of Service	F	B	A	F	C	B	F	D			F	D
Approach Delay (s)		24.3			34.2			64.1			70.4	
Approach LOS		C			C			E			E	

Intersection Summary			
HCM Average Control Delay	33.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	93.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
15: Oakley Road & Neroly Road

2030 PM & Proj with Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	30	178	140	20	109	107	60	243	20	177	363	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	187	147	21	115	113	63	256	21	186	382	21

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	366	248	340	589
Volume Left (vph)	32	21	63	186
Volume Right (vph)	147	113	21	21
Hadj (s)	-0.19	-0.22	0.03	0.08
Departure Headway (s)	7.8	8.2	8.0	7.7
Degree Utilization, x	0.79	0.57	0.75	1.26
Capacity (veh/h)	450	402	435	466
Control Delay (s)	34.2	21.5	31.6	158.2
Approach Delay (s)	34.2	21.5	31.6	158.2
Approach LOS	D	C	D	F

Intersection Summary			
Delay	78.9		
HCM Level of Service	F		
Intersection Capacity Utilization	83.0%	ICU Level of Service	E
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
16: Oakley Road & Live Oak Ave

2030 PM & Proj with Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	40	290	30	60	210	248	50	233	60	319	385	40
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	42	305	32	63	221	261	53	245	63	336	405	42

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	379	545	361	783
Volume Left (vph)	42	63	53	336
Volume Right (vph)	32	261	63	42
Hadj (s)	0.01	-0.23	-0.04	0.09
Departure Headway (s)	9.4	9.2	9.5	9.5
Degree Utilization, x	0.99	1.40	0.95	2.07
Capacity (veh/h)	379	401	374	384
Control Delay (s)	76.3	218.5	66.8	513.7
Approach Delay (s)	76.3	218.5	66.8	513.7
Approach LOS	F	F	F	F

Intersection Summary			
Delay	277.7		
HCM Level of Service	F		
Intersection Capacity Utilization	108.7%	ICU Level of Service	G
Analysis Period (min)	15		

17: Oakley Road & Empire Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↑	↱		↰↑	↱	↰	↑↑↱		↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95		1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1716	1583		1807	1583	1770	3515		1770	1863	1583
Flt Permitted	0.95	0.97	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1716	1583		1807	1583	1770	3515		1770	1863	1583
Volume (vph)	250	60	389	80	50	80	378	640	30	150	610	150
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	263	63	409	84	53	84	398	674	32	158	642	158
RTOR Reduction (vph)	0	0	365	0	0	73	0	3	0	0	0	80
Lane Group Flow (vph)	159	167	44	0	137	11	398	703	0	158	642	78
Turn Type	Split		Perm	Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8						6
Actuated Green, G (s)	12.1	12.1	12.1		13.5	13.5	26.3	52.8		14.0	40.5	40.5
Effective Green, g (s)	12.1	12.1	12.1		14.5	14.5	27.3	53.8		15.0	41.5	41.5
Actuated g/C Ratio	0.11	0.11	0.11		0.13	0.13	0.25	0.48		0.13	0.37	0.37
Clearance Time (s)	4.0	4.0	4.0		5.0	5.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	183	186	172		235	206	434	1698		238	694	590
v/s Ratio Prot	0.09	c0.10			c0.08		c0.22	0.20		0.09	c0.34	
v/s Ratio Perm			0.03			0.01						0.05
v/c Ratio	0.87	0.90	0.26		0.58	0.05	0.92	0.41		0.66	0.93	0.13
Uniform Delay, d1	48.9	49.0	45.5		45.6	42.4	40.9	18.6		45.8	33.5	23.1
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	32.6	38.3	0.8		3.7	0.1	23.9	0.2		6.8	18.2	0.1
Delay (s)	81.4	87.3	46.3		49.3	42.5	64.9	18.8		52.6	51.6	23.2
Level of Service	F	F	D		D	D	E	B		D	D	C
Approach Delay (s)		63.2			46.7			35.4			47.1	
Approach LOS		E			D			D			D	

Intersection Summary			
HCM Average Control Delay	46.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	111.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

18: Main Street & Empire Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑↱		↰↰	↑	↱		↰↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.97	1.00
Satd. Flow (prot)	1719	3539	1538	1770	3530		3335	1810	1583		1787	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.97	1.00
Satd. Flow (perm)	1719	3539	1538	1770	3530		3335	1810	1583		1787	1538
Volume (vph)	40	1801	540	350	1178	20	550	40	380	30	20	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	1896	568	368	1240	21	579	42	400	32	21	32
RTOR Reduction (vph)	0	0	172	0	1	0	0	0	207	0	0	31
Lane Group Flow (vph)	42	1896	396	368	1260	0	579	42	193	0	53	1
Heavy Vehicles (%)	5%	2%	5%	2%	2%	2%	5%	5%	2%	2%	5%	5%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	5.6	62.0	62.0	23.0	79.4		23.0	23.0	23.0		4.0	4.0
Effective Green, g (s)	6.6	63.0	63.0	24.0	80.4		24.0	24.0	24.0		4.0	4.0
Actuated g/C Ratio	0.05	0.48	0.48	0.18	0.61		0.18	0.18	0.18		0.03	0.03
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	87	1702	740	324	2167		611	332	290		55	47
v/s Ratio Prot	0.02	c0.54		c0.21	0.36		c0.17	0.02			c0.03	
v/s Ratio Perm			0.26						0.12			0.00
v/c Ratio	0.48	1.11	0.54	1.14	0.58		0.95	0.13	0.67		0.96	0.02
Uniform Delay, d1	60.5	34.0	23.8	53.5	15.2		52.9	44.7	49.8		63.4	61.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	4.2	60.1	0.7	92.0	0.4		23.9	0.2	5.7		107.4	0.2
Delay (s)	64.7	94.1	24.5	145.5	15.6		76.8	44.9	55.5		170.8	61.8
Level of Service	E	F	C	F	B		E	D	E		F	E
Approach Delay (s)		77.8			44.9			67.1			129.8	
Approach LOS		E			D			E			F	

Intersection Summary			
HCM Average Control Delay	66.4	HCM Level of Service	E
HCM Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	131.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	101.5%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

19: Main Street & Vintage Parkway

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑	↑↑↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3513		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3539	3513		1770	1583
Volume (vph)	58	1084	953	50	90	55
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	61	1141	1003	53	95	58
RTOR Reduction (vph)	0	0	4	0	0	50
Lane Group Flow (vph)	61	1141	1052	0	95	8
Turn Type	Prot					Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	3.2	43.0	35.8		8.9	8.9
Effective Green, g (s)	3.2	44.0	36.8		8.9	8.9
Actuated g/C Ratio	0.05	0.72	0.60		0.15	0.15
Clearance Time (s)	4.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	93	2557	2123		259	231
v/s Ratio Prot	c0.03	0.32	c0.30		c0.05	
v/s Ratio Perm						0.01
v/c Ratio	0.66	0.45	0.50		0.37	0.04
Uniform Delay, d1	28.3	3.5	6.8		23.5	22.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	15.4	0.1	0.2		0.9	0.1
Delay (s)	43.7	3.6	7.0		24.3	22.4
Level of Service	D	A	A		C	C
Approach Delay (s)		5.6	7.0		23.6	
Approach LOS		A	A		C	

Intersection Summary			
HCM Average Control Delay	7.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	60.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	46.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

20: Main Street & O'Hara Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑↱			↰↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.94			0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1770	1863	1583	1770	1856		1770	1751			1796	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.71	1.00			0.87	
Satd. Flow (perm)	1770	1863	1583	1770	1856		1332	1751			1599	
Volume (vph)	20	993	190	60	847	20	196	60	40	30	40	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	1045	200	63	892	21	206	63	42	32	42	11
RTOR Reduction (vph)	0	0	75	0	1	0	0	28	0	0	6	0
Lane Group Flow (vph)	21	1045	125	63	912	0	206	77	0	0	79	0
Turn Type	Prot		Perm	Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4				2			6		
Actuated Green, G (s)	1.5	53.7	53.7	3.1	55.3		16.4	16.4			17.4	
Effective Green, g (s)	1.5	54.7	54.7	3.1	56.3		17.4	17.4			17.4	
Actuated g/C Ratio	0.02	0.63	0.63	0.04	0.65		0.20	0.20			0.20	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	30	1169	993	63	1198		266	349			319	
v/s Ratio Prot	0.01	c0.56		c0.04	0.49			0.04				
v/s Ratio Perm			0.08				c0.15				0.05	
v/c Ratio	0.70	0.89	0.13	1.00	0.76		0.77	0.22			0.25	
Uniform Delay, d1	42.6	13.8	6.6	42.1	10.8		33.0	29.2			29.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	52.7	9.0	0.1	113.4	2.9		13.1	0.3			0.4	
Delay (s)	95.4	22.8	6.6	155.4	13.7		46.2	29.5			29.8	
Level of Service	F	C	A	F	B		D	C			C	
Approach Delay (s)		21.4			22.8			40.6			29.8	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM Average Control Delay	24.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	87.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
21: Cypress Road & Empire Avenue

2030 PM & Proj with Ramps
11/6/2006

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↱		↰	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.97		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3423		1770	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	3423		1770	3539
Volume (vph)	150	332	787	220	351	787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	158	349	828	232	369	828
RTOR Reduction (vph)	0	284	31	0	0	0
Lane Group Flow (vph)	158	65	1029	0	369	828
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	11.5	11.5	24.0		17.3	45.3
Effective Green, g (s)	12.5	12.5	25.0		17.3	46.3
Actuated g/C Ratio	0.19	0.19	0.37		0.26	0.69
Clearance Time (s)	5.0	5.0	5.0		4.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	331	296	1281		458	2453
v/s Ratio Prot	c0.09		c0.30		c0.21	0.23
v/s Ratio Perm		0.04				
v/c Ratio	0.48	0.22	0.80		0.81	0.34
Uniform Delay, d1	24.2	23.0	18.7		23.2	4.1
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.1	0.4	3.7		9.9	0.1
Delay (s)	25.3	23.4	22.5		33.1	4.2
Level of Service	C	C	C		C	A
Approach Delay (s)	24.0		22.5			13.1
Approach LOS	C		C			B

Intersection Summary			
HCM Average Control Delay	18.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	66.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
22: Cypress Road & Main Street

2030 PM & Proj with Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↱	↱	↰	↑↑	↱	↰↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	0.95	1.00	0.95	1.00	0.97	0.95	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3463		1770	1770	1504	1770	3539	1583	3433	3529	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3463		1770	1770	1504	1770	3539	1583	3433	3529	
Volume (vph)	100	422	70	280	400	832	130	545	410	1060	1023	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	444	74	295	421	876	137	574	432	1116	1077	21
RTOR Reduction (vph)	0	11	0	0	0	24	0	0	8	0	1	0
Lane Group Flow (vph)	105	507	0	295	421	852	137	574	424	1116	1097	0
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		
Protected Phases	7	4		3	8	1	5	2	3	1	6	
Permitted Phases						8			2			
Actuated Green, G (s)	8.8	18.0		21.0	30.2	70.2	12.2	25.0	46.0	40.0	52.8	
Effective Green, g (s)	8.8	18.0		21.0	30.2	70.2	12.2	25.0	46.0	40.0	52.8	
Actuated g/C Ratio	0.07	0.15		0.18	0.25	0.59	0.10	0.21	0.38	0.33	0.44	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	130	519		310	445	930	180	737	607	1144	1553	
v/s Ratio Prot	0.06	c0.15		0.17	c0.24	c0.31	0.08	c0.16	0.12	c0.33	0.31	
v/s Ratio Perm						0.26			0.15			
v/c Ratio	0.81	0.98		0.95	0.95	0.92	0.76	0.78	0.70	0.98	0.71	
Uniform Delay, d1	54.8	50.8		49.0	44.1	22.3	52.5	44.9	31.2	39.5	27.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	29.5	33.2		38.2	29.1	13.4	17.1	8.0	3.5	20.7	2.7	
Delay (s)	84.3	84.0		87.2	73.2	35.7	69.6	52.9	34.7	60.2	30.0	
Level of Service	F	F		F	E	D	E	D	C	E	C	
Approach Delay (s)		84.1			55.2			48.0			45.3	
Approach LOS		F			E			D			D	

Intersection Summary			
HCM Average Control Delay	53.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	102.2%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
23: Neroly Road & Live Oak Ave

2030 PM & Proj with Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↱			↰↱			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	20	283	239	136	213	170	89	173	76	151	213	30
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	298	252	143	224	179	94	182	80	159	224	32

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	170	401	255	291	356	415
Volume Left (vph)	21	0	143	0	94	159
Volume Right (vph)	0	252	0	179	80	32
Hadj (s)	0.10	-0.41	0.31	-0.40	-0.05	0.06
Departure Headway (s)	9.4	8.9	9.7	9.0	9.1	9.2
Degree Utilization, x	0.44	0.99	0.69	0.73	0.90	1.06
Capacity (veh/h)	382	401	361	390	386	395
Control Delay (s)	18.3	70.1	30.5	31.5	53.7	93.6
Approach Delay (s)	54.7		31.1		53.7	93.6
Approach LOS	F		D		F	F

Intersection Summary			
Delay	56.2		
HCM Level of Service	F		
Intersection Capacity Utilization	74.7%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
24: Laurel Road & Live Oak Avenue

2030 PM & Proj with Ramps
11/6/2006

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰↰	↑↑↑	↑↑↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	0.91	0.91		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3433	5085	5037		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	3433	5085	5037		1770	1583
Volume (vph)	419	1986	1463	100	320	190
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	441	2091	1540	105	337	200
RTOR Reduction (vph)	0	0	12	0	0	151
Lane Group Flow (vph)	441	2091	1633	0	337	49
Turn Type	Prot					Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	9.8	35.6	21.8		14.2	14.2
Effective Green, g (s)	9.8	35.6	21.8		14.2	14.2
Actuated g/C Ratio	0.17	0.62	0.38		0.25	0.25
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	582	3132	1900		435	389
v/s Ratio Prot	0.13	c0.41	c0.32		c0.19	
v/s Ratio Perm						0.03
v/c Ratio	0.76	0.67	0.86		0.77	0.13
Uniform Delay, d1	22.9	7.2	16.6		20.3	17.0
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	5.6	0.5	4.1		8.4	0.1
Delay (s)	28.5	7.8	20.7		28.7	17.1
Level of Service	C	A	C		C	B
Approach Delay (s)		11.4	20.7		24.4	
Approach LOS		B	C		C	

Intersection Summary			
HCM Average Control Delay	16.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	57.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

25: Laurel Road & Empire Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.98		1.00	0.97		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3450		1770	3485		1770	3441		1770	3316	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3450		1770	3485		1770	3441		1770	3316	
Volume (vph)	460	1537	310	110	1073	122	160	525	120	182	456	330
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	484	1618	326	116	1129	128	168	553	126	192	480	347
RTOR Reduction (vph)	0	13	0	0	7	0	0	15	0	0	100	0
Lane Group Flow (vph)	484	1931	0	116	1250	0	168	664	0	192	727	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	33.0	67.0		8.0	42.0		12.0	25.0		14.0	27.0	
Effective Green, g (s)	33.0	67.0		8.0	42.0		12.0	25.0		14.0	27.0	
Actuated g/C Ratio	0.25	0.52		0.06	0.32		0.09	0.19		0.11	0.21	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	449	1778		109	1126		163	662		191	689	
v/s Ratio Prot	c0.27	c0.56		0.07	0.36		0.09	0.19		c0.11	c0.22	
v/s Ratio Perm												
v/c Ratio	1.08	1.09		1.06	1.11		1.03	1.00		1.01	1.06	
Uniform Delay, d1	48.5	31.5		61.0	44.0		59.0	52.5		58.0	51.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	65.0	48.8		104.5	62.4		78.8	35.6		66.5	49.8	
Delay (s)	113.5	80.3		165.5	106.4		137.8	88.1		124.5	101.3	
Level of Service	F	F		F	F		F	F		F	F	
Approach Delay (s)		86.9			111.4			97.9			105.7	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	97.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	104.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

26: Proj Dwy & Bridgehead Road

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑	↱	↰	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	1863	1583	1770	1863
Volume (vph)	194	79	358	189	78	417
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	204	83	377	199	82	439
RTOR Reduction (vph)	0	66	0	96	0	0
Lane Group Flow (vph)	204	17	377	103	82	439
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	11.9	11.9	30.1	30.1	4.2	38.8
Effective Green, g (s)	12.4	12.4	31.1	31.1	4.7	39.8
Actuated g/C Ratio	0.21	0.21	0.52	0.52	0.08	0.66
Clearance Time (s)	4.5	4.5	5.0	5.0	4.5	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	365	326	962	818	138	1232
v/s Ratio Prot	c0.12		c0.20		c0.05	0.24
v/s Ratio Perm		0.01		0.06		
v/c Ratio	0.56	0.05	0.39	0.13	0.59	0.36
Uniform Delay, d1	21.4	19.2	8.8	7.5	26.8	4.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	0.1	1.2	0.3	6.7	0.8
Delay (s)	23.3	19.3	10.0	7.8	33.5	5.3
Level of Service	C	B	B	A	C	A
Approach Delay (s)	22.1		9.3			9.8
Approach LOS	C		A			A

Intersection Summary			
HCM Average Control Delay	12.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	60.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	43.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

27: Main Street & Proj Dwy Center

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑↑	↑↑↑	↱	↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	5085	5085	1583	1770	1583
Volume (vph)	171	2408	1665	151	209	135
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	180	2535	1753	159	220	142
RTOR Reduction (vph)	0	0	0	54	0	119
Lane Group Flow (vph)	180	2535	1753	105	220	23
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	16.7	100.3	79.1	79.1	20.7	20.7
Effective Green, g (s)	17.2	100.8	79.6	79.6	21.2	21.2
Actuated g/C Ratio	0.13	0.78	0.61	0.61	0.16	0.16
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	234	3943	3114	969	289	258
v/s Ratio Prot	c0.10	c0.50	0.34		c0.12	
v/s Ratio Perm				0.07		0.01
v/c Ratio	0.77	0.64	0.56	0.11	0.76	0.09
Uniform Delay, d1	54.5	6.5	14.9	10.5	52.0	46.2
Progression Factor	1.12	0.49	0.38	0.21	1.00	1.00
Incremental Delay, d2	7.7	0.4	0.2	0.1	11.2	0.2
Delay (s)	68.9	3.6	5.9	2.2	63.2	46.4
Level of Service	E	A	A	A	E	D
Approach Delay (s)		8.0	5.6		56.6	
Approach LOS		A	A		E	

Intersection Summary			
HCM Average Control Delay	10.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

28: Main Street & Proj Dwy East

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑↑	↑↑↑	↱	↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	5085	5085	1583	1770	1583
Volume (vph)	111	2522	1821	90	111	100
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	117	2655	1917	95	117	105
RTOR Reduction (vph)	0	0	0	33	0	94
Lane Group Flow (vph)	117	2655	1917	62	117	11
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		3	
Permitted Phases				6		3
Actuated Green, G (s)	25.0	108.5	79.5	79.5	13.5	13.5
Effective Green, g (s)	25.0	108.5	79.5	79.5	13.5	13.5
Actuated g/C Ratio	0.19	0.83	0.61	0.61	0.10	0.10
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	340	4244	3110	968	184	164
v/s Ratio Prot	0.07	c0.52	0.38		c0.07	
v/s Ratio Perm				0.04		0.01
v/c Ratio	0.34	0.63	0.62	0.06	0.64	0.07
Uniform Delay, d1	45.4	3.7	15.7	10.2	55.9	52.6
Progression Factor	0.63	0.37	0.42	0.27	1.00	1.00
Incremental Delay, d2	0.3	0.4	0.5	0.1	7.0	0.2
Delay (s)	29.0	1.8	7.2	2.8	62.9	52.7
Level of Service	C	A	A	A	E	D
Approach Delay (s)		2.9	7.0		58.1	
Approach LOS		A	A		E	

Intersection Summary			
HCM Average Control Delay	7.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		0.97	0.95		1.00	0.95	
Frt	1.00	0.87		1.00	0.96		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1619		1770	1782		3433	3417		1770	3521	
Flt Permitted	0.71	1.00		0.26	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1318	1619		493	1782		3433	3417		1770	3521	
Volume (vph)	20	50	339	111	50	20	390	390	117	20	560	20
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	54	368	121	54	22	424	424	127	22	609	22
RTOR Reduction (vph)	0	267	0	0	16	0	0	37	0	0	3	0
Lane Group Flow (vph)	22	155	0	121	60	0	424	514	0	22	628	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	15.1	15.1		15.1	15.1		10.6	26.4		1.3	17.1	
Effective Green, g (s)	15.1	15.1		15.1	15.1		10.6	26.4		1.3	17.1	
Actuated g/C Ratio	0.28	0.28		0.28	0.28		0.19	0.48		0.02	0.31	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	363	446		136	491		664	1646		42	1099	
v/s Ratio Prot		0.10			0.03		c0.12	0.15		0.01	c0.18	
v/s Ratio Perm	0.02			c0.25								
v/c Ratio	0.06	0.35		0.89	0.12		0.64	0.31		0.52	0.57	
Uniform Delay, d1	14.6	15.9		19.1	14.9		20.3	8.7		26.4	15.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.5		45.2	0.1		2.0	0.1		11.3	0.7	
Delay (s)	14.7	16.4		64.2	15.0		22.4	8.8		37.7	16.5	
Level of Service	B	B		E	B		C	A		D	B	
Approach Delay (s)		16.3			45.2			14.7			17.2	
Approach LOS		B			D			B			B	

Intersection Summary			
HCM Average Control Delay	18.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	54.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION     1 Minaker/Wilbur                    Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            20   10   10
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    10 ---  1.0   1.0  1.1  1.1   1.1 ---   10  RIGHT
                                                          STREET NAME:
THRU   821 ---> 2.1  (NO. OF LANES)   2.1<---  461  THRU  Wilbur

RIGHT  190 ---  1.1   1.1  1.1  1.0   1.0 ---   50  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  70    0   60                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Minaker
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO        V/C
------------------------------------------------------------------------
NB  RIGHT (R)      60         10 *     1650     0.0061
    THRU (T)        0          0       1650     0.0000
    LEFT (L)       70         70       1650     0.0424     0.0424
    T + L                     70       1650     0.0424
------------------------------------------------------------------------
SB  RIGHT (R)      20         10 *     1650     0.0061
    THRU (T)       10         10       1650     0.0061
    LEFT (L)       10         10       1650     0.0061
    T + L                     20       1650     0.0121     0.0121
------------------------------------------------------------------------
EB  RIGHT (R)     190        190       1650     0.1152
    THRU (T)      821        821       3300     0.2488
    LEFT (L)       10         10       1650     0.0061
    T + R                   1011       3300     0.3064     0.3064
------------------------------------------------------------------------
WB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      461        461       3300     0.1397
    LEFT (L)       50         50       1650     0.0303     0.0303
    T + R                    471       3300     0.1427
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.39
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION     6 Hillcrest/18th St                 Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            40  140   80
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    70 ---  1.0   1.0  1.0  1.0   1.1 ---   40  RIGHT
                                                          STREET NAME:
THRU   991 ---> 2.1  (NO. OF LANES)   2.1<---  551  THRU  18th St

RIGHT  230 ---  1.1   1.0  1.0  1.0   1.0 ---  301  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 190  210  321                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Hillcrest
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO        V/C
------------------------------------------------------------------------
NB  RIGHT (R)     321         20 *     1650     0.0121
    THRU (T)      210        210       1650     0.1273
    LEFT (L)      190        190       1650     0.1152     0.1152
------------------------------------------------------------------------
SB  RIGHT (R)      40          0 *     1650     0.0000
    THRU (T)      140        140       1650     0.0848     0.0848
    LEFT (L)       80         80       1650     0.0485
------------------------------------------------------------------------
EB  RIGHT (R)     230        230       1650     0.1394
    THRU (T)      991        991       3300     0.3003
    LEFT (L)       70         70       1650     0.0424
    T + R                   1221       3300     0.3700     0.3700
------------------------------------------------------------------------
WB  RIGHT (R)      40         40       1650     0.0242
    THRU (T)      551        551       3300     0.1670
    LEFT (L)      301        301       1650     0.1824     0.1824
    T + R                    591       3300     0.1791
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.75
     INTERSECTION LEVEL OF SERVICE:                             C
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION     7 Viera/18th St                     Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       2-PHASE SIGNAL
-----------           150   80   86
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   120 ---  1.0   1.1  1.1  1.1   1.1 ---   96  RIGHT
                                                          STREET NAME:
THRU  1073 ---> 2.0  (NO. OF LANES)   2.1<---  704  THRU  18th St

RIGHT  190 ---  1.0   1.1  1.1  1.0   1.0 ---   30  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 100   20   20                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Viera
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO        V/C
------------------------------------------------------------------------
NB  RIGHT (R)      20          0 *     1800     0.0000
    THRU (T)       20         20       1800     0.0111
    LEFT (L)      100        100       1800     0.0556     0.0556
    T + L                    120       1800     0.0667
------------------------------------------------------------------------
SB  RIGHT (R)     150        150       1800     0.0833
    THRU (T)       80         80       1800     0.0444
    LEFT (L)       86         86       1800     0.0478
    T + R                    230       1800     0.1278
    T + L                    166       1800     0.0922
    T + R + L                316       1800     0.1756     0.1756
------------------------------------------------------------------------
EB  RIGHT (R)     190         90 *     1800     0.0500
    THRU (T)     1073       1073       3600     0.2981     0.2981
    LEFT (L)      120        120       1800     0.0667
------------------------------------------------------------------------
WB  RIGHT (R)      96         96       1800     0.0533
    THRU (T)      704        704       3600     0.1956
    LEFT (L)       30         30       1800     0.0167     0.0167
    T + R                    800       3600     0.2222
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.55
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION     8 Phillips Lane/18th Street         Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------           310   10  250
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   280 ---  1.0   1.1  1.1  2.0   1.0 ---  230  RIGHT
                                                          STREET NAME:
THRU   924 ---> 2.1  (NO. OF LANES)   2.0<---  556  THRU  18th Street

RIGHT   20 ---  1.1   1.0  1.1  1.1   1.0 ---   20  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  20   10   50                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Phillips Lane
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO        V/C
------------------------------------------------------------------------
NB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)       10         10       1650     0.0061
    LEFT (L)       20         20       1650     0.0121
    T + R                     60       1650     0.0364     0.0364
------------------------------------------------------------------------
SB  RIGHT (R)     310        310       1650     0.1879
    THRU (T)       10         10       1650     0.0061
    LEFT (L)      250        250       3000     0.0833
    T + R                    320       1650     0.1939     0.1939
------------------------------------------------------------------------
EB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)      924        924       3300     0.2800
    LEFT (L)      280        280       1650     0.1697     0.1697
    T + R                    944       3300     0.2861
------------------------------------------------------------------------
WB  RIGHT (R)     230         93 *     1650     0.0564
    THRU (T)      556        556       3300     0.1685     0.1685
    LEFT (L)       20         20       1650     0.0121
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.57
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION     9 SR 160 SB Ramp/Main Street        Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            20   30   90
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    30 ---  1.0   1.1  1.1  1.0   1.0 ---  100  RIGHT
                                                          STREET NAME:
THRU  1044 ---> 2.1  (NO. OF LANES)   2.0<---  706  THRU  Main Street

RIGHT  160 ---  1.1   1.1  1.1  1.9   2.0 --- 1293  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  40   20  155                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 SB Ramp
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     155        155       1650     0.0939
    THRU (T)       20         20       1650     0.0121
    LEFT (L)       40         40       1650     0.0242
    T + L                     60       1650     0.0364     0.0364
------------------------------------------------------------------------
SB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)       30         30       1650     0.0182
    LEFT (L)       90         90       1650     0.0545     0.0545
    T + R                     50       1650     0.0303
------------------------------------------------------------------------
EB  RIGHT (R)     160        160       1650     0.0970
    THRU (T)     1044       1044       3300     0.3164
    LEFT (L)       30         30       1650     0.0182
    T + R                   1204       3300     0.3648     0.3648
------------------------------------------------------------------------
WB  RIGHT (R)     100         10 *     1650     0.0061
    THRU (T)      706        706       3300     0.2139
    LEFT (L)     1293       1293       3000     0.4310     0.4310
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.89
     INTERSECTION LEVEL OF SERVICE:                             D
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION    10 SR 160 NB Ramp/Main Street        Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0    0    0
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  RIGHT
                                                          STREET NAME:
THRU  1150 ---> 3.1  (NO. OF LANES)   3.0<--- 1909  THRU  Main Street

RIGHT  140 ---  1.1   1.0  0.0  2.5   1.0 ---  215  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 190    0 1826                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 NB Ramp
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)    1826       1435 *     3127     0.4589     0.4589
    LEFT (L)      190        190       1720     0.1105
------------------------------------------------------------------------
EB  RIGHT (R)     140        140       1720     0.0814
    THRU (T)     1150       1150       5160     0.2229
    T + R                   1290       5160     0.2500     0.2500
------------------------------------------------------------------------
WB  THRU (T)     1909       1909       5160     0.3700
    LEFT (L)      215        215       1720     0.1250     0.1250
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.83
     INTERSECTION LEVEL OF SERVICE:                             D
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION    11 Neroly/Main Street                Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------           264  119  227
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   240 ---  1.0   1.0  1.0  2.0   1.0 ---  168  RIGHT
                                                          STREET NAME:
THRU  2316 ---> 3.1  (NO. OF LANES)   3.0<--- 1649  THRU  Main Street

RIGHT  420 ---  1.1   2.0  1.1  1.1   1.0 ---   80  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 210  139   80                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Neroly
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      80         80       1650     0.0485
    THRU (T)      139        139       1650     0.0842
    LEFT (L)      210        210       3000     0.0700
    T + R                    219       1650     0.1327     0.1327
------------------------------------------------------------------------
SB  RIGHT (R)     264         24 *     1650     0.0145
    THRU (T)      119        119       1650     0.0721
    LEFT (L)      227        227       3000     0.0757     0.0757
------------------------------------------------------------------------
EB  RIGHT (R)     420        420       1650     0.2545
    THRU (T)     2316       2316       4950     0.4679
    LEFT (L)      240        240       1650     0.1455
    T + R                   2736       4950     0.5527     0.5527
------------------------------------------------------------------------
WB  RIGHT (R)     168         43 *     1650     0.0261
    THRU (T)     1649       1649       4950     0.3331
    LEFT (L)       80         80       1650     0.0485     0.0485
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.81
     INTERSECTION LEVEL OF SERVICE:                             D
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION    12 Sandy/Main Street                 Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------           172   15  211
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   205 ---  1.0   1.1  1.1  1.0   1.1 ---  145  RIGHT
                                                          STREET NAME:
THRU  2208 ---> 3.1  (NO. OF LANES)   3.1<--- 1615  THRU  Main Street

RIGHT  210 ---  1.1   1.0  1.0  1.0   1.0 ---   40  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 110   15  160                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Sandy
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     160        120 *     1650     0.0727     0.0727
    THRU (T)       15         15       1650     0.0091
    LEFT (L)      110        110       1650     0.0667
------------------------------------------------------------------------
SB  RIGHT (R)     172        172       1650     0.1042
    THRU (T)       15         15       1650     0.0091
    LEFT (L)      211        211       1650     0.1279     0.1279
    T + R                    187       1650     0.1133
------------------------------------------------------------------------
EB  RIGHT (R)     210        210       1650     0.1273
    THRU (T)     2208       2208       4950     0.4461
    LEFT (L)      205        205       1650     0.1242
    T + R                   2418       4950     0.4885     0.4885
------------------------------------------------------------------------
WB  RIGHT (R)     145        145       1650     0.0879
    THRU (T)     1615       1615       4950     0.3263
    LEFT (L)       40         40       1650     0.0242     0.0242
    T + R                   1760       4950     0.3556
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.71
     INTERSECTION LEVEL OF SERVICE:                             C
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION    13 Live Oak/Main Street               Oakley
Count Date                   Time                 Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------           202  421  387
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   292 ---  1.0   1.1  2.1  2.0   1.1 ---  378  RIGHT
                                                          STREET NAME:
THRU  2075 ---> 3.0  (NO. OF LANES)   3.1<--- 1441  THRU  Main Street

RIGHT  250 ---  1.0   1.0  2.1  1.1   1.0 ---  102  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 173  227  171                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
========================================================================
               ORIGINAL   ADJUSTED                  V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     171         171       1650     0.1036
    THRU (T)      227         227       3300     0.0688
    LEFT (L)      173         173       1650     0.1048     0.1048
    T + R                     398       3300     0.1206
------------------------------------------------------------------------
SB  RIGHT (R)     202         202       1650     0.1224
    THRU (T)      421         421       3300     0.1276
    LEFT (L)      387         387       3000     0.1290
    T + R                     623       3300     0.1888     0.1888
------------------------------------------------------------------------
EB  RIGHT (R)     250          77 *     1650     0.0467
    THRU (T)     2075        2075       4950     0.4192
    LEFT (L)      292         292       1650     0.1770     0.1770
------------------------------------------------------------------------
WB  RIGHT (R)     378         378       1650     0.2291
    THRU (T)     1441        1441       4950     0.2911
    LEFT (L)      102         102       1650     0.0618
    T + R                    1819       4950     0.3675     0.3675
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.84
     INTERSECTION LEVEL OF SERVICE:                             D
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION    14 Big Break/Main Street             Oakley
Count Date                   Time                 Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------           246   40   90
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   297 ---  1.0   1.0  1.1  1.1   1.0 ---   80  RIGHT
                                                          STREET NAME:
THRU  2155 ---> 2.0  (NO. OF LANES)   2.0<--- 1546  THRU  Main Street

RIGHT  180 ---  1.0   1.0  1.1  1.1   1.0 ---   90  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 120   60   90                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Big Break
========================================================================
               ORIGINAL   ADJUSTED                  V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      90          90       1650     0.0545
    THRU (T)       60          60       1650     0.0364
    LEFT (L)      120         120       1650     0.0727     0.0727
    T + R                     150       1650     0.0909
------------------------------------------------------------------------
SB  RIGHT (R)     246           0 *     1650     0.0000
    THRU (T)       40          40       1650     0.0242
    LEFT (L)       90          90       1650     0.0545
    T + L                     130       1650     0.0788     0.0788
------------------------------------------------------------------------
EB  RIGHT (R)     180          60 *     1650     0.0364
    THRU (T)     2155        2155       3300     0.6530     0.6530
    LEFT (L)      297         297       1650     0.1800
------------------------------------------------------------------------
WB  RIGHT (R)      80           0 *     1650     0.0000
    THRU (T)     1546        1546       3300     0.4685
    LEFT (L)       90          90       1650     0.0545     0.0545
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.86
     INTERSECTION LEVEL OF SERVICE:                             D
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION    17 Empire Ave/Oakley Road            Oakley
Count Date                   Time                 Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------           150  610  150
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? Y
LEFT   250 ---  2.1   1.0  1.0  1.0   1.0 ---   80  RIGHT
                                                          STREET NAME:
THRU    60 ---> 1.1  (NO. OF LANES)   1.1<---   50  THRU  Oakley Road

RIGHT  389 ---  1.0   1.0  2.1  1.1   1.1 ---   80  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 378  640   30                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire Ave
========================================================================
               ORIGINAL   ADJUSTED                  V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      30          30       1650     0.0182
    THRU (T)      640         640       3300     0.1939
    LEFT (L)      378         378       1650     0.2291     0.2291
    T + R                     670       3300     0.2030
------------------------------------------------------------------------
SB  RIGHT (R)     150          13 *     1650     0.0079
    THRU (T)      610         610       1650     0.3697     0.3697
    LEFT (L)      150         150       1650     0.0909
------------------------------------------------------------------------
EB  RIGHT (R)     389          11 *     1650     0.0067
    THRU (T)       60          60       1650     0.0364
    LEFT (L)      250         250       3000     0.0833
    T + L                     310       3000     0.1033     0.1033
------------------------------------------------------------------------
WB  RIGHT (R)      80           0 *     1650     0.0000
    THRU (T)       50          50       1650     0.0303
    LEFT (L)       80          80       1650     0.0485
    T + L                     130       1650     0.0788     0.0788
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.78
     INTERSECTION LEVEL OF SERVICE:                             C
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION    18 Empire Avenue/Main Street         Oakley
Count Date                   Time                 Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------            30   20   30
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    40 ---  1.0   1.0  1.1  1.1   1.1 ---   20  RIGHT
                                                          STREET NAME:
THRU  1801 ---> 2.0  (NO. OF LANES)   2.1<--- 1178  THRU  Main Street

RIGHT  540 ---  1.0   2.0  1.0  1.0   1.0 ---  350  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 550   40  380                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Empire Avenue
========================================================================
               ORIGINAL   ADJUSTED                  V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     380          30 *     1650     0.0182
    THRU (T)       40          40       1650     0.0242
    LEFT (L)      550         550       3000     0.1833     0.1833
------------------------------------------------------------------------
SB  RIGHT (R)      30           0 *     1650     0.0000
    THRU (T)       20          20       1650     0.0121
    LEFT (L)       30          30       1650     0.0182
    T + L                      50       1650     0.0303     0.0303
------------------------------------------------------------------------
EB  RIGHT (R)     540         238 *     1650     0.1442
    THRU (T)     1801        1801       3300     0.5458     0.5458
    LEFT (L)       40          40       1650     0.0242
------------------------------------------------------------------------
WB  RIGHT (R)      20          20       1650     0.0121
    THRU (T)     1178        1178       3300     0.3570
    LEFT (L)      350         350       1650     0.2121     0.2121
    T + R                    1198       3300     0.3630
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.97
     INTERSECTION LEVEL OF SERVICE:                             E
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION    19 Vintage/Main Street               Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------            55    0   90
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    58 ---  1.0   1.0  0.0  1.0   1.1 ---   50  RIGHT
                                                          STREET NAME:
THRU  1084 ---> 2.0  (NO. OF LANES)   2.1<---  953  THRU  Main Street

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Vintage
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)      55          0 *     1720     0.0000
    LEFT (L)       90         90       1720     0.0523     0.0523
------------------------------------------------------------------------
EB  THRU (T)     1084       1084       3440     0.3151
    LEFT (L)       58         58       1720     0.0337     0.0337
------------------------------------------------------------------------
WB  RIGHT (R)      50         50       1720     0.0291
    THRU (T)      953        953       3440     0.2770
    T + R                   1003       3440     0.2916     0.2916
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.38
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION    20 O'Hara Avenue/Main Street         Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            10   40   30
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    20 ---  1.0   1.1  1.1  1.1   1.1 ---   20  RIGHT
                                                          STREET NAME:
THRU   993 ---> 1.0  (NO. OF LANES)   1.1<---  847  THRU  Main Street

RIGHT  190 ---  1.0   1.0  1.1  1.1   1.0 ---   60  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 196   60   40                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: O'Hara Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      40         40       1650     0.0242
    THRU (T)       60         60       1650     0.0364
    LEFT (L)      196        196       1650     0.1188     0.1188
    T + R                    100       1650     0.0606
------------------------------------------------------------------------
SB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)       40         40       1650     0.0242
    LEFT (L)       30         30       1650     0.0182
    T + R                     50       1650     0.0303
    T + L                     70       1650     0.0424
    T + R + L                 80       1650     0.0485     0.0485
------------------------------------------------------------------------
EB  RIGHT (R)     190          0 *     1650     0.0000
    THRU (T)      993        993       1650     0.6018     0.6018
    LEFT (L)       20         20       1650     0.0121
------------------------------------------------------------------------
WB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)      847        847       1650     0.5133
    LEFT (L)       60         60       1650     0.0364     0.0364
    T + R                    867       1650     0.5255
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.81
     INTERSECTION LEVEL OF SERVICE:                             D
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION    21 Empire Avenue/Cypress Road        Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0  787  351
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  2.0  1.0   1.0 ---  332  RIGHT
                                                          STREET NAME:
THRU     0 ---> 0.0  (NO. OF LANES)   0.0<---    0  THRU  Cypress Road

RIGHT    0 ---  0.0   0.0  2.1  1.1   1.0 ---  150  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0  787  220                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     220        220       1720     0.1279
    THRU (T)      787        787       3440     0.2288
    T + R                   1007       3440     0.2927     0.2927
------------------------------------------------------------------------
SB  THRU (T)      787        787       3440     0.2288
    LEFT (L)      351        351       1720     0.2041     0.2041
------------------------------------------------------------------------
WB  RIGHT (R)     332          0 *     1720     0.0000
    LEFT (L)      150        150       1720     0.0872     0.0872
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.58
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION    22 Main Street/Cypress               Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            20 1023 1060
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   100 ---  1.0   1.1  2.1  2.0   2.6 ---  832  RIGHT
                                                          STREET NAME:
THRU   422 ---> 2.1  (NO. OF LANES)   1.1<---  400  THRU  Cypress

RIGHT   70 ---  1.1   1.0  2.0  1.5   1.0 ---  280  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 130  545  410                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Main Street
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     410        130 *     1650     0.0788
    THRU (T)      545        545       3300     0.1652     0.1652
    LEFT (L)      130        130       1650     0.0788
------------------------------------------------------------------------
SB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)     1023       1023       3300     0.3100
    LEFT (L)     1060       1060       3000     0.3533     0.3533
    T + R                   1043       3300     0.3161
------------------------------------------------------------------------
EB  RIGHT (R)      70         70       1650     0.0424
    THRU (T)      422        422       3300     0.1279
    LEFT (L)      100        100       1650     0.0606
    T + R                    492       3300     0.1491     0.1491
------------------------------------------------------------------------
WB  RIGHT (R)     832        249 *     3000     0.0830
    THRU (T)      400        400       1650     0.2424
    LEFT (L)      280        280       1650     0.1697     0.1697
    T + R                    649       3000     0.2163
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.84
     INTERSECTION LEVEL OF SERVICE:                             D
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION    24 Live Oak/Laurel                   Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------           190    0  320
                        |    |    |
            ^           |    |    |        ^
            |       <---    v    --->      | Split? N
LEFT   419 ---  2.0   1.0  0.0  1.0   1.1 ---  100  RIGHT
                                                          STREET NAME:
THRU  1986 ---> 3.0  (NO. OF LANES)   3.1<--- 1463  THRU  Laurel

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
            |       <---    ^    --->      |
            v           |    |    |        v
  N                     |    |    |                   SIG WARRANTS:
W + E                   0    0    0                     Urb=Y, Rur=Y
  S                 LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
========================================================================
                ORIGINAL   ADJUSTED                 V/C     CRITICAL
   MOVEMENT      VOLUME     VOLUME*   CAPACITY     RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)     190           0 *     1720     0.0000
     LEFT (L)     320         320       1720     0.1860      0.1860
------------------------------------------------------------------------
EB  THRU (T)     1986        1986       5160     0.3849
     LEFT (L)     419         419       3127     0.1340      0.1340
------------------------------------------------------------------------
WB  RIGHT (R)     100         100       1720     0.0581
    THRU (T)     1463        1463       5160     0.2835
    T + R                    1563       5160     0.3029      0.3029
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                           0.62
     INTERSECTION LEVEL OF SERVICE:                              B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION    25 Empire/Laurel                     Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------           330  456  182
                        |    |    |
            ^           |    |    |        ^
            |       <---    v    --->      | Split? N
LEFT   460 ---  1.0   1.1  2.1  1.0   1.1 ---  122  RIGHT
                                                          STREET NAME:
THRU  1537 ---> 2.1  (NO. OF LANES)   2.1<--- 1073  THRU  Laurel

RIGHT  310 ---  1.1   1.0  2.1  1.1   1.0 ---  110  LEFT
            |       <---    ^    --->      |
            v           |    |    |        v
  N                     |    |    |                   SIG WARRANTS:
W + E                 160  525  120                     Urb=Y, Rur=Y
  S                 LEFT THRU RIGHT Split? N

               STREET NAME: Empire
========================================================================
                ORIGINAL   ADJUSTED                 V/C     CRITICAL
   MOVEMENT      VOLUME     VOLUME*   CAPACITY     RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     120         120       1650     0.0727
    THRU (T)      525         525       3300     0.1591
    LEFT (L)      160         160       1650     0.0970      0.0970
    T + R                     645       3300     0.1955
------------------------------------------------------------------------
SB  RIGHT (R)     330         330       1650     0.2000
    THRU (T)      456         456       3300     0.1382
    LEFT (L)      182         182       1650     0.1103
    T + R                     786       3300     0.2382      0.2382
------------------------------------------------------------------------
EB  RIGHT (R)     310         310       1650     0.1879
    THRU (T)     1537        1537       3300     0.4658
    LEFT (L)      460         460       1650     0.2788      0.2788
    T + R                    1847       3300     0.5597
------------------------------------------------------------------------
WB  RIGHT (R)     122         122       1650     0.0739
    THRU (T)     1073        1073       3300     0.3252
    LEFT (L)      110         110       1650     0.0667
    T + R                    1195       3300     0.3621      0.3621
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                           0.98
     INTERSECTION LEVEL OF SERVICE:                              E
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION    26 Bridgehead/Proj Dwy #1            Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0  417   78
                        |    |    |
            ^           |    |    |        ^
            |       <---    v    --->      | Split? N
LEFT     0 ---  0.0   0.0  1.0  1.0   1.0 ---   79  RIGHT
                                                          STREET NAME:
THRU     0 ---> 0.0  (NO. OF LANES)   0.0<---    0  THRU  Proj Dwy #1

RIGHT    0 ---  0.0   0.0  1.0  1.0   1.0 ---  194  LEFT
            |       <---    ^    --->      |
            v           |    |    |        v
  N                     |    |    |                   SIG WARRANTS:
W + E                   0  358  189                     Urb=N, Rur=Y
  S                 LEFT THRU RIGHT Split? N

               STREET NAME: Bridgehead
========================================================================
                ORIGINAL   ADJUSTED                 V/C     CRITICAL
   MOVEMENT      VOLUME     VOLUME*   CAPACITY     RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     189           0 *     1720     0.0000
    THRU (T)      358         358       1720     0.2081      0.2081
------------------------------------------------------------------------
SB  THRU (T)      417         417       1720     0.2424
     LEFT (L)      78          78       1720     0.0453      0.0453
------------------------------------------------------------------------
WB  RIGHT (R)      79           1 *     1720     0.0006
     LEFT (L)     194         194       1720     0.1128      0.1128
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                           0.37
     INTERSECTION LEVEL OF SERVICE:                              A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION    27 Proj Dwy Center/Main Street       Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------           135    0  209
                        |    |    |
            ^           |    |    |        ^
            |       <---    v    --->      | Split? N
LEFT   171 ---  1.0   1.0  0.0  1.0   1.0 ---  151  RIGHT
                                                          STREET NAME:
THRU  2408 ---> 3.0  (NO. OF LANES)   3.0<--- 1665  THRU  Main Street

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
            |       <---    ^    --->      |
            v           |    |    |        v
  N                     |    |    |                   SIG WARRANTS:
W + E                   0    0    0                     Urb=Y, Rur=Y
  S                 LEFT THRU RIGHT Split? N

               STREET NAME: Proj Dwy Center
========================================================================
                ORIGINAL   ADJUSTED                 V/C     CRITICAL
   MOVEMENT      VOLUME     VOLUME*   CAPACITY     RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)     135           0 *     1720     0.0000
     LEFT (L)     209         209       1720     0.1215      0.1215
------------------------------------------------------------------------
EB  THRU (T)     2408        2408       5160     0.4667      0.4667
     LEFT (L)     171         171       1720     0.0994
------------------------------------------------------------------------
WB  RIGHT (R)     151           0 *     1720     0.0000
    THRU (T)     1665        1665       5160     0.3227
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                           0.59
     INTERSECTION LEVEL OF SERVICE:                              A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION    28 Proj Dwy East/Main Street         Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------           100    0  111
                        |   |   |
             ^          |   |   |        ^
             |       <---   v   --->     | Split? N
LEFT   111 ---  1.0   1.0  0.0  1.0   1.0 ---   90  RIGHT
                                                          STREET NAME:
THRU  2522 ---> 3.0  (NO. OF LANES)   3.0<--- 1821  THRU  Main Street

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->     |
             v          |   |   |        v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Proj Dwy East
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)     100          0 *     1720     0.0000
    LEFT (L)      111        111       1720     0.0645     0.0645
------------------------------------------------------------------------
EB  THRU (T)     2522       2522       5160     0.4888     0.4888
    LEFT (L)      111        111       1720     0.0645
------------------------------------------------------------------------
WB  RIGHT (R)      90          0 *     1720     0.0000
    THRU (T)     1821       1821       5160     0.3529
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.55
     INTERSECTION LEVEL OF SERVICE:                              A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project WITH RAMPS                         11/03/06
========================================================================
INTERSECTION    29 Proj Dwy/Live Oak Ave             Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            20  560   20
                        |   |   |
             ^          |   |   |        ^
             |       <---   v   --->     | Split? N
LEFT    20 ---  1.0   1.1  2.1  1.0   1.1 ---   20  RIGHT
                                                          STREET NAME:
THRU    50 ---> 1.1  (NO. OF LANES)   1.1<---   50  THRU  Live Oak Ave

RIGHT  339 ---  1.1   2.0  2.1  1.1   1.0 ---  111  LEFT
             |       <---   ^   --->     |
             v          |   |   |        v
  N                     |   |   |                         SIG WARRANTS:
W + E                 390  390  117                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Proj Dwy
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     117        117       1650     0.0709
    THRU (T)      390        390       3300     0.1182
    LEFT (L)      390        390       3000     0.1300     0.1300
    T + R                    507       3300     0.1536
------------------------------------------------------------------------
SB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)      560        560       3300     0.1697
    LEFT (L)       20         20       1650     0.0121
    T + R                    580       3300     0.1758     0.1758
------------------------------------------------------------------------
EB  RIGHT (R)     339        339       1650     0.2055
    THRU (T)       50         50       1650     0.0303
    LEFT (L)       20         20       1650     0.0121
    T + R                    389       1650     0.2358     0.2358
------------------------------------------------------------------------
WB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)       50         50       1650     0.0303
    LEFT (L)      111        111       1650     0.0673     0.0673
    T + R                     70       1650     0.0424
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.61
     INTERSECTION LEVEL OF SERVICE:                              B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

Cumulative (2030) With Project AM Mitigation

HCM Signalized Intersection Capacity Analysis
3: Wilbur Avenue & SR 160 SB Off

2030 AM & Proj with Ramps
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↱		↰	↑↑					↰		↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0					4.0		4.0
Lane Util. Factor		1.00		1.00	0.95					1.00		1.00
Frt		0.96		1.00	1.00					1.00		0.85
Flt Protected		1.00		0.95	1.00					0.95		1.00
Satd. Flow (prot)		1789		1770	3539					1770		1583
Flt Permitted		1.00		0.95	1.00					0.95		1.00
Satd. Flow (perm)		1789		1770	3539					1770		1583
Volume (vph)	0	263	110	280	667	0	0	0	0	102	0	120
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	277	116	295	702	0	0	0	0	107	0	126
RTOR Reduction (vph)	0	17	0	0	0	0	0	0	0	0	0	110
Lane Group Flow (vph)	0	376	0	295	702	0	0	0	0	107	0	16
Turn Type				Prot						custom		custom
Protected Phases		2		1	6							
Permitted Phases										7		4
Actuated Green, G (s)		33.0		15.3	52.8					8.2		8.2
Effective Green, g (s)		33.5		15.8	53.3					8.7		8.7
Actuated g/C Ratio		0.48		0.23	0.76					0.12		0.12
Clearance Time (s)		4.5		4.5	4.5					4.5		4.5
Vehicle Extension (s)		3.0		3.0	3.0					3.0		3.0
Lane Grp Cap (vph)		856		400	2695					220		197
v/s Ratio Prot		c0.21		c0.17	0.20							
v/s Ratio Perm										c0.06		0.01
v/c Ratio		0.44		0.74	0.26					0.49		0.08
Uniform Delay, d1		12.1		25.2	2.5					28.6		27.1
Progression Factor		1.00		0.95	1.22					1.00		1.00
Incremental Delay, d2		1.6		6.3	0.2					1.7		0.2
Delay (s)		13.7		30.3	3.2					30.3		27.3
Level of Service		B		C	A					C		C
Approach Delay (s)		13.7			11.3			0.0			28.6	
Approach LOS		B			B			A			C	

Intersection Summary			
HCM Average Control Delay	14.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
4: Wilbur Avenue & SR 160 NB On

2030 AM & Proj with Ramps
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑			↑↑↱		↰		↱			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0		4.0			
Lane Util. Factor	1.00	0.95			0.95		1.00		1.00			
Frt	1.00	1.00			0.97		1.00		0.85			
Flt Protected	0.95	1.00			1.00		0.95		1.00			
Satd. Flow (prot)	1770	3539			3435		1770		1583			
Flt Permitted	0.95	1.00			1.00		0.95		1.00			
Satd. Flow (perm)	1770	3539			3435		1770		1583			
Volume (vph)	50	315	0	0	687	167	260	0	280	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	332	0	0	723	176	274	0	295	0	0	0
RTOR Reduction (vph)	0	0	0	0	22	0	0	0	227	0	0	0
Lane Group Flow (vph)	53	332	0	0	877	0	274	0	68	0	0	0
Turn Type	Prot						custom		custom			
Protected Phases	5	2			6							
Permitted Phases							3		3			
Actuated Green, G (s)	3.4	45.4			37.5		15.6		15.6			
Effective Green, g (s)	3.9	45.9			38.0		16.1		16.1			
Actuated g/C Ratio	0.06	0.66			0.54		0.23		0.23			
Clearance Time (s)	4.5	4.5			4.5		4.5		4.5			
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Lane Grp Cap (vph)	99	2321			1865		407		364			
v/s Ratio Prot	c0.03	0.09			c0.26							
v/s Ratio Perm							c0.15		0.04			
v/c Ratio	0.54	0.14			0.47		0.67		0.19			
Uniform Delay, d1	32.2	4.6			9.8		24.6		21.7			
Progression Factor	0.85	0.25			0.50		1.00		1.00			
Incremental Delay, d2	5.2	0.1			0.6		4.4		0.2			
Delay (s)	32.4	1.3			5.5		28.9		21.9			
Level of Service	C	A			A		C		C			
Approach Delay (s)		5.6			5.5			25.3			0.0	
Approach LOS		A			A			C			A	

Intersection Summary			
HCM Average Control Delay	11.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
5: Wilbur Avenue & Bridgehead Road

2030 AM & Proj with Ramps
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↱			↰↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Frt	1.00	0.97		1.00	1.00		1.00	0.89			0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1770	1810		1770	1857		1770	1649			1765	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00			0.91	
Satd. Flow (perm)	1770	1810		1770	1857		1770	1649			1616	
Volume (vph)	30	459	106	30	466	10	368	30	100	10	30	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	483	112	32	491	11	387	32	105	11	32	21
RTOR Reduction (vph)	0	11	0	0	1	0	0	66	0	0	20	0
Lane Group Flow (vph)	32	584	0	32	501	0	387	71	0	0	44	0
Turn Type	Prot			Prot			Prot			Perm		
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases										4		
Actuated Green, G (s)	1.6	30.2		1.6	29.7		17.5	25.2			3.2	
Effective Green, g (s)	2.1	30.7		1.6	30.2		18.0	25.7			3.7	
Actuated g/C Ratio	0.03	0.44		0.02	0.43		0.26	0.37			0.05	
Clearance Time (s)	4.5	4.5		4.0	4.5		4.5	4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	53	794		40	801		455	605			85	
v/s Ratio Prot	0.02	c0.32		0.02	c0.27		c0.22	0.04				
v/s Ratio Perm											c0.03	
v/c Ratio	0.60	0.74		0.80	0.63		0.85	0.12			0.52	
Uniform Delay, d1	33.5	16.3		34.0	15.5		24.7	14.6			32.3	
Progression Factor	0.95	0.89		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	17.5	5.9		69.2	3.7		14.1	0.1			5.3	
Delay (s)	49.4	20.4		103.2	19.2		38.9	14.7			37.5	
Level of Service	D	C		F	B		D	B			D	
Approach Delay (s)		21.9			24.2			32.6			37.5	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM Average Control Delay	26.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	64.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
15: Oakley Road & Neroly Road

2030 AM & Proj with Ramps
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.94		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1806		1770	1750		1770	1845		1770	1840	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1806		1770	1750		1770	1845		1770	1840	
Volume (vph)	20	79	20	20	227	153	180	296	20	93	223	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	83	21	21	239	161	189	312	21	98	235	21
RTOR Reduction (vph)	0	13	0	0	34	0	0	3	0	0	4	0
Lane Group Flow (vph)	21	91	0	21	366	0	189	330	0	98	252	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	1.2	15.6		1.2	15.6		8.0	20.0		3.7	15.7	
Effective Green, g (s)	1.7	16.1		1.7	16.1		8.5	20.5		4.2	16.2	
Actuated g/C Ratio	0.03	0.28		0.03	0.28		0.15	0.35		0.07	0.28	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	51	497		51	482		257	647		127	510	
v/s Ratio Prot	c0.01	0.05		0.01	c0.21		c0.11	c0.18		0.06	0.14	
v/s Ratio Perm												
v/c Ratio	0.41	0.18		0.41	0.76		0.74	0.51		0.77	0.49	
Uniform Delay, d1	27.9	16.2		27.9	19.4		23.9	15.0		26.7	17.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.3	0.2		5.3	6.8		10.4	0.6		24.6	0.8	
Delay (s)	33.2	16.4		33.2	26.2		34.3	15.7		51.3	18.5	
Level of Service	C	B		C	C		C	B		D	B	
Approach Delay (s)		19.2			26.5			22.4			27.6	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM Average Control Delay	24.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	58.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

16: Oakley Road & Live Oak Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.94		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1846		1770	1744		1770	1814		1770	1803	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1846		1770	1744		1770	1814		1770	1803	
Volume (vph)	30	160	10	70	280	208	50	240	50	119	139	38
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	168	11	74	295	219	53	253	53	125	146	40
RTOR Reduction (vph)	0	4	0	0	39	0	0	10	0	0	13	0
Lane Group Flow (vph)	32	175	0	74	475	0	53	296	0	125	173	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	1.2	16.6		3.3	18.7		2.9	14.4		5.1	16.6	
Effective Green, g (s)	1.7	17.1		3.8	19.2		3.4	14.9		5.6	17.1	
Actuated g/C Ratio	0.03	0.30		0.07	0.33		0.06	0.26		0.10	0.30	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	52	550		117	583		105	471		173	537	
v/s Ratio Prot	0.02	0.10		c0.04	c0.27		0.03	c0.16		c0.07	0.10	
v/s Ratio Perm												
v/c Ratio	0.62	0.32		0.63	0.82		0.50	0.63		0.72	0.32	
Uniform Delay, d1	27.5	15.6		26.1	17.5		26.2	18.8		25.1	15.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	19.7	0.3		10.6	8.6		3.8	2.6		13.9	0.3	
Delay (s)	47.2	16.0		36.8	26.1		30.0	21.4		39.0	16.0	
Level of Service	D	B		D	C		C	C		D	B	
Approach Delay (s)		20.7			27.4			22.7			25.2	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	24.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	57.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

17: Oakley Road & Empire Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↑	↱		↰↑	↱	↰	↑↑↱		↰	↑↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00		1.00	0.96	
Flt Protected	0.95	0.96	1.00		0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1681	1696	1583		1804	1583	1770	3522		1770	3405	
Flt Permitted	0.95	0.96	1.00		0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1681	1696	1583		1804	1583	1770	3522		1770	3405	
Volume (vph)	140	10	229	20	10	20	428	584	20	50	325	110
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	147	11	241	21	11	21	451	615	21	53	342	116
RTOR Reduction (vph)	0	0	143	0	0	20	0	2	0	0	34	0
Lane Group Flow (vph)	77	81	98	0	32	1	451	634	0	53	424	0
Turn Type	Split		pm+ov	Split		Perm	Prot			Prot		
Protected Phases	4	4	5	8	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	5.1	5.1	25.5		3.6	3.6	20.4	34.8		2.4	16.8	
Effective Green, g (s)	5.1	5.1	26.5		4.6	4.6	21.4	35.8		3.4	17.8	
Actuated g/C Ratio	0.08	0.08	0.41		0.07	0.07	0.33	0.55		0.05	0.27	
Clearance Time (s)	4.0	4.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	132	133	646		128	112	584	1943		93	934	
v/s Ratio Prot	0.05	c0.05	0.05		c0.02		c0.25	0.18		0.03	c0.12	
v/s Ratio Perm			0.01			0.00						
v/c Ratio	0.58	0.61	0.15		0.25	0.01	0.77	0.33		0.57	0.45	
Uniform Delay, d1	28.9	28.9	12.1		28.5	28.0	19.6	8.0		30.0	19.5	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.4	7.7	0.1		1.0	0.0	6.3	0.1		7.8	0.4	
Delay (s)	35.3	36.6	12.2		29.5	28.1	25.8	8.1		37.8	19.9	
Level of Service	D	D	B		C	C	C	A		D	B	
Approach Delay (s)		21.6			29.0			15.4			21.7	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM Average Control Delay	18.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	64.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

18: Main Street & Charles Way

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰↰	↑↑↱		↰↰	↑	↱		↰↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.97	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.98	1.00
Satd. Flow (prot)	1719	3539	1538	3433	3531		3335	1810	1583		1797	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.98	1.00
Satd. Flow (perm)	1719	3539	1538	3433	3531		3335	1810	1583		1797	1538
Volume (vph)	20	813	235	210	1345	20	524	20	200	20	40	50
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	856	247	221	1416	21	552	21	211	21	42	53
RTOR Reduction (vph)	0	0	94	0	1	0	0	0	89	0	0	51
Lane Group Flow (vph)	21	856	153	221	1436	0	552	21	122	0	63	2
Heavy Vehicles (%)	5%	2%	5%	2%	2%	2%	5%	5%	2%	2%	5%	5%
Turn Type	Prot		pm+ov	Prot			Split		pm+ov	Split		Perm
Protected Phases	7	4	2	3	8		2	2	3	6	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	1.3	28.2	45.2	8.6	35.5		17.0	17.0	25.6		3.6	3.6
Effective Green, g (s)	2.3	29.2	47.2	9.6	36.5		18.0	18.0	27.6		3.6	3.6
Actuated g/C Ratio	0.03	0.38	0.62	0.13	0.48		0.24	0.24	0.36		0.05	0.05
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	52	1353	1031	431	1687		786	426	572		85	72
v/s Ratio Prot	0.01	0.24	0.03	c0.06	c0.41		c0.17	0.01	0.03		c0.04	
v/s Ratio Perm			0.06						0.05			0.00
v/c Ratio	0.40	0.63	0.15	0.51	0.85		0.70	0.05	0.21		0.74	0.03
Uniform Delay, d1	36.4	19.2	6.1	31.2	17.6		26.7	22.6	16.9		35.9	34.7
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	5.1	1.0	0.1	1.0	4.4		2.9	0.0	0.2		28.9	0.2
Delay (s)	41.4	20.2	6.2	32.2	21.9		29.6	22.6	17.1		64.9	34.9
Level of Service	D	C	A	C	C		C	C	B		E	C
Approach Delay (s)		17.5			23.3			26.0			51.2	
Approach LOS		B			C			C			D	

Intersection Summary			
HCM Average Control Delay	23.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	76.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	72.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

23: Neroly Road & Live Oak Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↑↱			↰↑↑↱		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00	1.00	
Frt		0.95			0.96		1.00	0.92		1.00	0.94	
Flt Protected		1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3360			3380		1770	1722		1770	1758	
Flt Permitted		1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		3360			3380		1770	1722		1770	1758	
Volume (vph)	20	151	78	66	271	114	259	156	158	98	33	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	159	82	69	285	120	273	164	166	103	35	21
RTOR Reduction (vph)	0	70	0	0	43	0	0	44	0	0	17	0
Lane Group Flow (vph)	0	192	0	0	431	0	273	286	0	103	39	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)		8.7			12.5		11.3	17.7		5.4	11.8	
Effective Green, g (s)		9.2			13.0		11.3	18.2		5.4	12.3	
Actuated g/C Ratio		0.15			0.21		0.18	0.29		0.09	0.20	
Clearance Time (s)		4.5			4.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		500			711		324	507		155	350	
v/s Ratio Prot		c0.06			c0.13		c0.15	c0.17		0.06	0.02	
v/s Ratio Perm												
v/c Ratio		0.38			0.61		0.84	0.56		0.66	0.11	
Uniform Delay, d1		23.7			22.1		24.4	18.4		27.3	20.3	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.5			1.5		17.7	1.4		10.3	0.1	
Delay (s)		24.2			23.6		42.1	19.9		37.6	20.4	
Level of Service		C			C		D	B		D	C	
Approach Delay (s)		24.2			23.6			29.9			31.5	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	27.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	61.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

25: Laurel Road & Empire Avenue

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑	↱	↰	↑↱		↰	↑↱		↰	↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3454		1770	3490		1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3454		1770	3490		1770	3539	1583
Volume (vph)	220	728	150	60	1371	261	180	496	50	51	258	420
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	232	766	158	63	1443	275	189	522	53	54	272	442
RTOR Reduction (vph)	0	0	81	0	14	0	0	7	0	0	0	137
Lane Group Flow (vph)	232	766	77	63	1704	0	189	568	0	54	272	305
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Actuated Green, G (s)	9.0	54.4	54.4	7.4	52.8		12.0	27.5		6.3	21.8	21.8
Effective Green, g (s)	9.0	54.4	54.4	7.4	52.8		12.0	27.5		6.3	21.8	21.8
Actuated g/C Ratio	0.08	0.49	0.49	0.07	0.47		0.11	0.25		0.06	0.20	0.20
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	277	1725	772	117	1634		190	860		100	691	309
v/s Ratio Prot	c0.07	0.22		0.04	c0.49		c0.11	0.16		0.03	0.08	
v/s Ratio Perm			0.05									c0.19
v/c Ratio	0.84	0.44	0.10	0.54	1.04		0.99	0.66		0.54	0.39	0.99
Uniform Delay, d1	50.6	18.7	15.4	50.4	29.4		49.8	37.9		51.2	39.1	44.8
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	19.3	0.2	0.1	4.7	34.3		63.4	1.9		5.8	0.4	47.4
Delay (s)	69.9	18.9	15.5	55.2	63.7		113.2	39.8		57.1	39.5	92.1
Level of Service	E	B	B	E	E		F	D		E	D	F
Approach Delay (s)		28.7			63.4			57.9			71.0	
Approach LOS		C			E			E			E	

Intersection Summary			
HCM Average Control Delay	54.8	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	111.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	92.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 WITH RAMPS Mitigation                           11/01/06
========================================================================
INTERSECTION     3 SR 160 SB Ramps/Wilbur            Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------           120    0  102
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   1.0  0.0  1.0   0.0 ---    0  RIGHT
                                                          STREET NAME:
THRU   263 ---> 1.1  (NO. OF LANES)   2.0<---  667  THRU  Wilbur

RIGHT  110 ---  1.1   0.0  0.0  0.0   1.0 ---  280  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 SB Ramps
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT    VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)     120        120       1720     0.0698     0.0698
    LEFT (L)      102        102       1720     0.0593
------------------------------------------------------------------------
EB  RIGHT (R)     110        110       1720     0.0640
    THRU (T)      263        263       1720     0.1529
    T + R                    373       1720     0.2169     0.2169
------------------------------------------------------------------------
WB  THRU (T)      667        667       3440     0.1939
    LEFT (L)      280        280       1720     0.1628     0.1628
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.45
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 WITH RAMPS Mitigation                           11/01/06
========================================================================
INTERSECTION     4 SR 160 NB Ramps/Wilbur            Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0    0    0
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    50 ---  1.0   0.0  0.0  0.0   1.1 ---  167  RIGHT
                                                          STREET NAME:
THRU   315 ---> 2.0  (NO. OF LANES)   2.1<---  687  THRU  Wilbur

RIGHT    0 ---  0.0   1.0  0.0  1.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 260    0  280                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 NB Ramps
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT    VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     280        280       1720     0.1628     0.1628
    LEFT (L)      260        260       1720     0.1512
------------------------------------------------------------------------
EB  THRU (T)      315        315       3440     0.0916
    LEFT (L)       50         50       1720     0.0291     0.0291
------------------------------------------------------------------------
WB  RIGHT (R)     167        167       1720     0.0971
    THRU (T)      687        687       3440     0.1997
    T + R                    854       3440     0.2483     0.2483
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.44
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 WITH RAMPS Mitigation                           11/01/06
========================================================================
INTERSECTION     5 Bridgehead/Wilbur                 Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            20   30   10
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    30 ---  1.0   1.1  1.1  1.1   1.1 ---   10  RIGHT
                                                          STREET NAME:
THRU   459 ---> 1.1  (NO. OF LANES)   1.1<---  466  THRU  Wilbur

RIGHT  106 ---  1.1   1.0  1.1  1.1   1.0 ---   30  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 368   30  100                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Bridgehead
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT    VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     100        100       1650     0.0606
    THRU (T)       30         30       1650     0.0182
    LEFT (L)      368        368       1650     0.2230     0.2230
    T + R                    130       1650     0.0788
------------------------------------------------------------------------
SB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)       30         30       1650     0.0182
    LEFT (L)       10         10       1650     0.0061
    T + R                     50       1650     0.0303
    T + L                     40       1650     0.0242
    T + R + L                 60       1650     0.0364     0.0364
------------------------------------------------------------------------
EB  RIGHT (R)     106        106       1650     0.0642
    THRU (T)      459        459       1650     0.2782
    LEFT (L)       30         30       1650     0.0182
    T + R                    565       1650     0.3424     0.3424
------------------------------------------------------------------------
WB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      466        466       1650     0.2824
    LEFT (L)       30         30       1650     0.0182     0.0182
    T + R                    476       1650     0.2885
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.62
     INTERSECTION LEVEL OF SERVICE:                             B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 WITH RAMPS Mitigation                           11/01/06
========================================================================
INTERSECTION    15 Neroly/Oakley                     Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            20  223   93
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    20 ---  1.0   1.1  1.1  1.0   1.1 ---  153  RIGHT
                                                          STREET NAME:
THRU    79 ---> 1.1  (NO. OF LANES)   1.1<---  227  THRU  Oakley

RIGHT   20 ---  1.1   1.0  1.1  1.1   1.0 ---   20  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 180  296   20                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Neroly
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT    VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)      296        296       1650     0.1794
    LEFT (L)      180        180       1650     0.1091     0.1091
    T + R                    316       1650     0.1915
------------------------------------------------------------------------
SB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)      223        223       1650     0.1352
    LEFT (L)       93         93       1650     0.0564
    T + R                    243       1650     0.1473     0.1473
------------------------------------------------------------------------
EB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)       79         79       1650     0.0479
    LEFT (L)       20         20       1650     0.0121     0.0121
    T + R                     99       1650     0.0600
------------------------------------------------------------------------
WB  RIGHT (R)     153        153       1650     0.0927
    THRU (T)      227        227       1650     0.1376
    LEFT (L)       20         20       1650     0.0121
    T + R                    380       1650     0.2303     0.2303
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.50
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 WITH RAMPS Mitigation                           11/01/06
========================================================================
INTERSECTION    16 Live Oak/Oakley                   Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            38  139  119
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    30 ---  1.0   1.1  1.1  1.0   1.1 ---  208  RIGHT
                                                          STREET NAME:
THRU   160 ---> 1.1  (NO. OF LANES)   1.1<---  280  THRU  Oakley

RIGHT   10 ---  1.1   1.0  1.1  1.1   1.0 ---   70  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  50  240   50                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)      240        240       1650     0.1455
    LEFT (L)       50         50       1650     0.0303
    T + R                    290       1650     0.1758     0.1758
------------------------------------------------------------------------
SB  RIGHT (R)      38         38       1650     0.0230
    THRU (T)      139        139       1650     0.0842
    LEFT (L)      119        119       1650     0.0721     0.0721
    T + R                    177       1650     0.1073
------------------------------------------------------------------------
EB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      160        160       1650     0.0970
    LEFT (L)       30         30       1650     0.0182     0.0182
    T + R                    170       1650     0.1030
------------------------------------------------------------------------
WB  RIGHT (R)     208        208       1650     0.1261
    THRU (T)      280        280       1650     0.1697
    LEFT (L)       70         70       1650     0.0424
    T + R                    488       1650     0.2958     0.2958
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.56
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 WITH RAMPS Mitigation                           11/01/06
========================================================================
INTERSECTION    17 Empire/Oakley                     Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------           110  325   50
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? Y
LEFT   140 ---  2.1   1.1  2.1  1.0   1.0 ---   20  RIGHT
                                                          STREET NAME:
THRU    10 ---> 1.1  (NO. OF LANES)   1.1<---   10  THRU  Oakley

RIGHT  229 ---  1.5   1.0  2.1  1.1   1.1 ---   20  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 428  584   20                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)      584        584       3300     0.1770
    LEFT (L)      428        428       1650     0.2594     0.2594
    T + R                    604       3300     0.1830
------------------------------------------------------------------------
SB  RIGHT (R)     110        110       1650     0.0667
    THRU (T)      325        325       3300     0.0985
    LEFT (L)       50         50       1650     0.0303
    T + R                    435       3300     0.1318     0.1318
------------------------------------------------------------------------
EB  RIGHT (R)     229          0 *     1650     0.0000
    THRU (T)       10         10       1650     0.0061
    LEFT (L)      140        140       3000     0.0467
    T + L                    150       3000     0.0500     0.0500
------------------------------------------------------------------------
WB  RIGHT (R)      20          0 *     1650     0.0000
    THRU (T)       10         10       1650     0.0061
    LEFT (L)       20         20       1650     0.0121
    T + L                     30       1650     0.0182     0.0182
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.46
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 WITH RAMPS Mitigation                           11/01/06
========================================================================
INTERSECTION    18 Empire Avenue/Main Street         Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------            50   40   20
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    20 ---  1.0   1.0  1.1  1.1   1.1 ---   20  RIGHT
                                                          STREET NAME:
THRU   813 ---> 2.0  (NO. OF LANES)   2.1<--- 1345  THRU  Main Street

RIGHT  235 ---  1.5   2.0  1.0  1.5   2.0 ---  210  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 524   20  200                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Empire Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     200         85 *     1650     0.0515
    THRU (T)       20         20       1650     0.0121
    LEFT (L)      524        524       3000     0.1747     0.1747
------------------------------------------------------------------------
SB  RIGHT (R)      50         30 *     1650     0.0182
    THRU (T)       40         40       1650     0.0242
    LEFT (L)       20         20       1650     0.0121
    T + L                     60       1650     0.0364     0.0364
------------------------------------------------------------------------
EB  RIGHT (R)     235          0 *     1650     0.0000
    THRU (T)      813        813       3300     0.2464
    LEFT (L)       20         20       1650     0.0121     0.0121
------------------------------------------------------------------------
WB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)     1345       1345       3300     0.4076
    LEFT (L)      210        210       3000     0.0700
    T + R                   1365       3300     0.4136     0.4136
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.64
     INTERSECTION LEVEL OF SERVICE:                             B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 WITH RAMPS Mitigation                           11/01/06
========================================================================
INTERSECTION    23 Live Oak/Neroly                   Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------            20   33   98
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? Y
LEFT    20 ---  1.1   1.1  1.1  1.0   1.1 ---  114  RIGHT
                                                          STREET NAME:
THRU   151 ---> 2.2  (NO. OF LANES)   2.2<---  271  THRU  Neroly

RIGHT   78 ---  1.1   1.0  1.1  1.1   1.1 ---   66  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 259  156  158                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     158        158       1650     0.0958
    THRU (T)      156        156       1650     0.0945
    LEFT (L)      259        259       1650     0.1570
    T + R                    314       1650     0.1903     0.1903
------------------------------------------------------------------------
SB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)       33         33       1650     0.0200
    LEFT (L)       98         98       1650     0.0594     0.0594
    T + R                     53       1650     0.0321
------------------------------------------------------------------------
EB  RIGHT (R)      78         78       1650     0.0473
    THRU (T)      151        151       3300     0.0458
    LEFT (L)       20         20       1650     0.0121
    T + R                    229       3300     0.0694
    T + L                    171       3300     0.0518
    T + R + L                249       3300     0.0755     0.0755
------------------------------------------------------------------------
WB  RIGHT (R)     114        114       1650     0.0691
    THRU (T)      271        271       3300     0.0821
    LEFT (L)       66         66       1650     0.0400
    T + R                    385       3300     0.1167
    T + L                    337       3300     0.1021
    T + R + L                451       3300     0.1367     0.1367
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.46
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 WITH RAMPS Mitigation                          11/01/06
========================================================================
INTERSECTION    25 Empire/Laurel                     Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------           420  258   51
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   220 ---  2.0   1.0  2.0  1.0   1.1 ---  261  RIGHT
                                                          STREET NAME:
THRU   728 ---> 2.0  (NO. OF LANES)   2.1<--- 1371  THRU  Laurel

RIGHT  150 ---  1.0   1.0  2.1  1.1   1.0 ---   60  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 180  496   50                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire
========================================================================
               ORIGINAL   ADJUSTED               V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)      496        496       3300     0.1503
    LEFT (L)      180        180       1650     0.1091     0.1091
    T + R                    546       3300     0.1655
------------------------------------------------------------------------
SB  RIGHT (R)     420        299 *     1650     0.1812     0.1812
    THRU (T)      258        258       3300     0.0782
    LEFT (L)       51         51       1650     0.0309
------------------------------------------------------------------------
EB  RIGHT (R)     150          0 *     1650     0.0000
    THRU (T)      728        728       3300     0.2206
    LEFT (L)      220        220       3000     0.0733     0.0733
------------------------------------------------------------------------
WB  RIGHT (R)     261        261       1650     0.1582
    THRU (T)     1371       1371       3300     0.4155
    LEFT (L)       60         60       1650     0.0364
    T + R                   1632       3300     0.4945     0.4945
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                          0.86
     INTERSECTION LEVEL OF SERVICE:                              D
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

Cumulative (2030) With Project PM Mitigation

HCM Signalized Intersection Capacity Analysis 2030 PM & Proj with Ramps

3: Wilbur Avenue & SR 160 SB Off

11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↱		↰	↑↑					↰		↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0					4.0		4.0
Lane Util. Factor		1.00		1.00	0.95					1.00		1.00
Frt		0.97		1.00	1.00					1.00		0.85
Flt Protected		1.00		0.95	1.00					0.95		1.00
Satd. Flow (prot)		1806		1770	3539					1770		1583
Flt Permitted		1.00		0.95	1.00					0.95		1.00
Satd. Flow (perm)		1806		1770	3539					1770		1583
Volume (vph)	0	658	190	160	468	0	0	0	0	266	0	90
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	693	200	168	493	0	0	0	0	280	0	95
RTOR Reduction (vph)	0	10	0	0	0	0	0	0	0	0	0	77
Lane Group Flow (vph)	0	883	0	168	493	0	0	0	0	280	0	18
Turn Type				Prot						custom		custom
Protected Phases		2		1	6							
Permitted Phases										7		7
Actuated Green, G (s)		47.0		13.2	64.7					16.3		16.3
Effective Green, g (s)		47.5		13.7	65.2					16.8		16.8
Actuated g/C Ratio		0.53		0.15	0.72					0.19		0.19
Clearance Time (s)		4.5		4.5	4.5					4.5		4.5
Vehicle Extension (s)		3.0		3.0	3.0					3.0		3.0
Lane Grp Cap (vph)		953		269	2564					330		295
v/s Ratio Prot		c0.49		c0.09	0.14							
v/s Ratio Perm										c0.16		0.01
v/c Ratio		0.93		0.62	0.19					0.85		0.06
Uniform Delay, d1		19.6		35.7	4.0					35.4		30.1
Progression Factor		1.00		0.85	0.30					1.00		1.00
Incremental Delay, d2		16.0		4.2	0.2					18.0		0.1
Delay (s)		35.6		34.7	1.3					53.4		30.2
Level of Service		D		C	A					D		C
Approach Delay (s)		35.6			9.8			0.0			47.5	
Approach LOS		D			A			A			D	

Intersection Summary			
HCM Average Control Delay	29.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis 2030 PM & Proj with Ramps

4: Wilbur Avenue & SR 160 NB On

11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑			↑↑↱		↰		↱			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0		4.0			
Lane Util. Factor	1.00	0.95			0.95		1.00		1.00			
Frt	1.00	1.00			0.98		1.00		0.85			
Flt Protected	0.95	1.00			1.00		0.95		1.00			
Satd. Flow (prot)	1770	3539			3456		1770		1583			
Flt Permitted	0.95	1.00			1.00		0.95		1.00			
Satd. Flow (perm)	1770	3539			3456		1770		1583			
Volume (vph)	330	594	0	0	578	107	50	0	120	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	347	625	0	0	608	113	53	0	126	0	0	0
RTOR Reduction (vph)	0	0	0	0	12	0	0	0	114	0	0	0
Lane Group Flow (vph)	347	625	0	0	709	0	53	0	12	0	0	0
Turn Type	Prot						custom		custom			
Protected Phases	5	2			6							
Permitted Phases							3		3			
Actuated Green, G (s)	21.8	73.0			46.7		8.0		8.0			
Effective Green, g (s)	22.3	73.5			47.2		8.5		8.5			
Actuated g/C Ratio	0.25	0.82			0.52		0.09		0.09			
Clearance Time (s)	4.5	4.5			4.5		4.5		4.5			
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Lane Grp Cap (vph)	439	2890			1812		167		150			
v/s Ratio Prot	c0.20	0.18			c0.21							
v/s Ratio Perm							c0.03		0.01			
v/c Ratio	0.79	0.22			0.39		0.32		0.08			
Uniform Delay, d1	31.7	1.8			12.8		38.0		37.2			
Progression Factor	0.88	1.60			0.76		1.00		1.00			
Incremental Delay, d2	4.2	0.1			0.6		1.1		0.2			
Delay (s)	32.1	3.0			10.3		39.1		37.4			
Level of Service	C	A			B		D		D			
Approach Delay (s)		13.4			10.3			37.9			0.0	
Approach LOS		B			B			D			A	

Intersection Summary			
HCM Average Control Delay	14.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis 2030 PM & Proj with Ramps

5: Wilbur Avenue & Bridgehead Road

11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↱			↰↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Frt	1.00	0.94		1.00	1.00		1.00	0.93			0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1770	1751		1770	1856		1770	1723			1714	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00			0.94	
Satd. Flow (perm)	1770	1751		1770	1856		1770	1723			1624	
Volume (vph)	30	409	275	30	439	10	196	50	50	10	30	50
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	431	289	32	462	11	206	53	53	11	32	53
RTOR Reduction (vph)	0	24	0	0	1	0	0	39	0	0	50	0
Lane Group Flow (vph)	32	696	0	32	472	0	206	67	0	0	46	0
Turn Type	Prot			Prot			Prot			Perm		
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases										4		
Actuated Green, G (s)	3.2	50.6		2.4	49.8		13.9	23.5			5.1	
Effective Green, g (s)	3.7	51.1		2.9	50.3		14.4	24.0			5.6	
Actuated g/C Ratio	0.04	0.57		0.03	0.56		0.16	0.27			0.06	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	73	994		57	1037		283	459			101	
v/s Ratio Prot	0.02	c0.40		0.02	c0.25		c0.12	0.04				
v/s Ratio Perm											c0.03	
v/c Ratio	0.44	0.70		0.56	0.46		0.73	0.15			0.46	
Uniform Delay, d1	42.1	14.0		42.9	11.7		35.9	25.2			40.7	
Progression Factor	1.40	0.41		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	4.1	4.0		12.0	1.4		9.0	0.1			3.3	
Delay (s)	63.0	9.7		55.0	13.2		44.9	25.3			44.0	
Level of Service	E	A		D	B		D	C			D	
Approach Delay (s)		12.0			15.8			38.3			44.0	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM Average Control Delay	19.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis 2030 PM & Proj with Ramps

15: Oakley Road & Neroly Road

11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.93		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1740		1770	1724		1770	1842		1770	1848	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1740		1770	1724		1770	1842		1770	1848	
Volume (vph)	30	178	140	20	109	107	60	243	20	177	363	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	187	147	21	115	113	63	256	21	186	382	21
RTOR Reduction (vph)	0	51	0	0	65	0	0	5	0	0	3	0
Lane Group Flow (vph)	32	283	0	21	163	0	63	272	0	186	400	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	1.2	10.0		0.6	9.4		2.0	16.8		5.8	20.6	
Effective Green, g (s)	1.2	10.0		0.6	9.4		2.0	16.8		5.8	20.6	
Actuated g/C Ratio	0.02	0.20		0.01	0.19		0.04	0.34		0.12	0.42	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	43	354		22	329		72	629		209	774	
v/s Ratio Prot	c0.02	c0.16		0.01	0.09		0.04	0.15		c0.11	c0.22	
v/s Ratio Perm												
v/c Ratio	0.74	0.80		0.95	0.50		0.88	0.43		0.89	0.52	
Uniform Delay, d1	23.8	18.6		24.3	17.8		23.5	12.5		21.4	10.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	50.5	11.9		169.9	1.2		64.5	0.5		33.5	0.6	
Delay (s)	74.3	30.6		194.2	19.0		88.0	13.0		54.9	11.2	
Level of Service	E	C		F	B		F	B		D	B	
Approach Delay (s)		34.4			33.7			26.9			25.0	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	29.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	49.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
2030 PM & Proj with Ramps

16: Oakley Road & Live Oak Ave
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.92		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1836		1770	1711		1770	1806		1770	1836	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1836		1770	1711		1770	1806		1770	1836	
Volume (vph)	40	290	30	60	210	248	50	233	60	319	385	40
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	305	32	63	221	261	53	245	63	336	405	42
RTOR Reduction (vph)	0	5	0	0	55	0	0	11	0	0	5	0
Lane Group Flow (vph)	42	332	0	63	427	0	53	297	0	336	442	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	2.0	19.2		2.5	19.7		2.0	17.0		15.8	30.8	
Effective Green, g (s)	2.0	19.2		2.5	19.7		2.0	17.0		15.8	30.8	
Actuated g/C Ratio	0.03	0.27		0.04	0.28		0.03	0.24		0.22	0.44	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	50	500		63	478		50	435		397	802	
v/s Ratio Prot	0.02	0.18		c0.04	c0.25		0.03	c0.16		c0.19	0.24	
v/s Ratio Perm												
v/c Ratio	0.84	0.66		1.00	0.89		1.06	0.68		0.85	0.55	
Uniform Delay, d1	34.1	22.8		34.0	24.4		34.2	24.3		26.2	14.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	69.8	3.3		113.4	18.8		145.2	4.4		15.2	0.8	
Delay (s)	103.9	26.1		147.4	43.2		179.5	28.7		41.4	15.6	
Level of Service	F	C		F	D		F	C		D	B	
Approach Delay (s)		34.7			55.2			50.8			26.7	
Approach LOS		C			E			D			C	

Intersection Summary			
HCM Average Control Delay	39.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	70.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2030 PM & Proj with Ramps

17: Oakley Road & Empire Avenue
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↑	↱		↰↑	↱	↰	↑ ↑↱		↰	↑ ↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.99		1.00	0.97	
Flt Protected	0.95	0.97	1.00		0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1681	1716	1583		1807	1583	1770	3515		1770	3434	
Flt Permitted	0.95	0.97	1.00		0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1681	1716	1583		1807	1583	1770	3515		1770	3434	
Volume (vph)	250	60	389	80	50	80	378	640	30	150	610	150
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	263	63	409	84	53	84	398	674	32	158	642	158
RTOR Reduction (vph)	0	0	179	0	0	73	0	3	0	0	18	0
Lane Group Flow (vph)	159	167	230	0	137	11	398	703	0	158	782	0
Turn Type	Split		pm+ov	Split		Perm	Prot			Prot		
Protected Phases	4	4	5	8	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	13.3	13.3	41.8		13.4	13.4	28.5	47.3		17.0	35.8	
Effective Green, g (s)	13.3	13.3	42.8		14.4	14.4	29.5	48.3		18.0	36.8	
Actuated g/C Ratio	0.12	0.12	0.39		0.13	0.13	0.27	0.44		0.16	0.33	
Clearance Time (s)	4.0	4.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	203	207	616		237	207	475	1543		290	1149	
v/s Ratio Prot	0.09	c0.10	0.10		c0.08		c0.22	0.20		0.09	c0.23	
v/s Ratio Perm			0.05			0.01						
v/c Ratio	0.78	0.81	0.37		0.58	0.05	0.84	0.46		0.54	0.68	
Uniform Delay, d1	47.0	47.1	24.0		44.9	41.8	38.0	21.6		42.2	31.5	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.31	1.40	
Incremental Delay, d2	17.7	20.1	0.4		3.4	0.1	12.2	1.0		1.6	2.5	
Delay (s)	64.6	67.2	24.4		48.3	41.9	50.2	22.6		56.8	46.8	
Level of Service	E	E	C		D	D	D	C		E	D	
Approach Delay (s)		42.8			45.9			32.6			48.5	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM Average Control Delay	41.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	67.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2030 PM & Proj with Ramps

18: Main Street & Empire Avenue
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰↰	↑ ↑↱		↰↰	↑	↱		↰↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.97	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.97	1.00
Satd. Flow (prot)	1719	3539	1538	3433	3530		3335	1810	1583		1787	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.97	1.00
Satd. Flow (perm)	1719	3539	1538	3433	3530		3335	1810	1583		1787	1538
Volume (vph)	40	1801	540	350	1178	20	550	40	380	30	20	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	1896	568	368	1240	21	579	42	400	32	21	32
RTOR Reduction (vph)	0	0	63	0	1	0	0	0	20	0	0	31
Lane Group Flow (vph)	42	1896	505	368	1260	0	579	42	380	0	53	1
Heavy Vehicles (%)	5%	2%	5%	2%	2%	2%	5%	5%	2%	2%	5%	5%
Turn Type	Prot		pm+ov	Prot			Split		pm+ov	Split		Perm
Protected Phases	7	4	2	3	8		2	2	3	6	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	3.6	56.0	75.3	12.4	64.8		19.3	19.3	31.7		3.3	3.3
Effective Green, g (s)	4.6	57.0	77.3	13.4	65.8		20.3	20.3	33.7		3.3	3.3
Actuated g/C Ratio	0.04	0.52	0.70	0.12	0.60		0.18	0.18	0.31		0.03	0.03
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	72	1834	1137	418	2112		615	334	485		54	46
v/s Ratio Prot	0.02	c0.54	0.08	c0.11	0.36		c0.17	0.02	0.10		c0.03	
v/s Ratio Perm			0.25						0.14			0.00
v/c Ratio	0.58	1.03	0.44	0.88	0.60		0.94	0.13	0.78		0.98	0.02
Uniform Delay, d1	51.8	26.5	7.1	47.5	13.8		44.3	37.4	34.8		53.3	51.8
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.09	1.03	1.04		1.00	1.00
Incremental Delay, d2	11.5	30.3	0.3	18.9	0.5		22.2	0.7	7.1		115.3	0.2
Delay (s)	63.2	56.8	7.3	66.5	14.3		70.3	39.3	43.3		168.6	52.0
Level of Service	E	E	A	E	B		E	D	D		F	D
Approach Delay (s)		45.7			26.1			58.5			124.7	
Approach LOS		D			C			E			F	

Intersection Summary			
HCM Average Control Delay	43.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	92.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2030 PM & Proj with Ramps

23: Neroly Road & Live Oak Ave
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑ ↑↱			↰↑ ↑↱		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			0.95		1.00	1.00		1.00	1.00	
Frt		0.93			0.95		1.00	0.95		1.00	0.98	
Flt Protected		1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3299			3322		1770	1777		1770	1828	
Flt Permitted		1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		3299			3322		1770	1777		1770	1828	
Volume (vph)	20	283	239	136	213	170	89	173	76	151	213	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	298	252	143	224	179	94	182	80	159	224	32
RTOR Reduction (vph)	0	184	0	0	74	0	0	20	0	0	7	0
Lane Group Flow (vph)	0	387	0	0	472	0	94	242	0	159	249	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)		12.4			13.6		5.1	13.2		7.6	15.7	
Effective Green, g (s)		12.9			14.1		5.1	13.7		7.6	16.2	
Actuated g/C Ratio		0.20			0.22		0.08	0.21		0.12	0.25	
Clearance Time (s)		4.5			4.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		662			728		140	379		209	461	
v/s Ratio Prot		c0.12			c0.14		0.05	0.14		c0.09	c0.14	
v/s Ratio Perm												
v/c Ratio		0.58			0.65		0.67	0.64		0.76	0.54	
Uniform Delay, d1		23.3			22.8		28.8	23.0		27.5	20.8	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.3			2.0		12.0	3.5		15.0	1.3	
Delay (s)		24.6			24.8		40.7	26.5		42.5	22.1	
Level of Service		C			C		D	C		D	C	
Approach Delay (s)		24.6			24.8			30.3			29.9	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	26.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	64.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

25: Laurel Road & Empire Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑	↱	↰	↑↱		↰	↑↱		↰	↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3485		1770	3441		1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3485		1770	3441		1770	3539	1583
Volume (vph)	460	1537	310	110	1073	122	160	525	120	182	456	330
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	484	1618	326	116	1129	128	168	553	126	192	480	347
RTOR Reduction (vph)	0	0	152	0	9	0	0	20	0	0	0	202
Lane Group Flow (vph)	484	1618	174	116	1248	0	168	659	0	192	480	145
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Actuated Green, G (s)	15.0	46.0	46.0	7.0	38.0		12.3	20.0		11.0	18.7	18.7
Effective Green, g (s)	15.0	46.0	46.0	7.0	38.0		12.3	20.0		11.0	18.7	18.7
Actuated g/C Ratio	0.15	0.46	0.46	0.07	0.38		0.12	0.20		0.11	0.19	0.19
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	515	1628	728	124	1324		218	688		195	662	296
v/s Ratio Prot	c0.14	c0.46		0.07	0.36		0.09	c0.19		c0.11	0.14	
v/s Ratio Perm			0.11									0.09
v/c Ratio	0.94	0.99	0.24	0.94	0.94		0.77	0.96		0.98	0.73	0.49
Uniform Delay, d1	42.1	26.9	16.4	46.3	30.0		42.5	39.6		44.4	38.2	36.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	25.1	20.7	0.2	60.6	13.3		15.4	24.1		59.6	3.9	1.3
Delay (s)	67.2	47.6	16.6	106.8	43.3		57.9	63.7		104.0	42.2	37.6
Level of Service	E	D	B	F	D		E	E		F	D	D
Approach Delay (s)		47.3			48.7			62.5			52.3	
Approach LOS		D			D			E			D	

Intersection Summary			
HCM Average Control Delay	50.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	90.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 WITH RAMPS Mitigation                           11/01/06
========================================================================
INTERSECTION     3 SR 160 SB Ramps/Wilbur            Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------            90    0  266
                        |   |   |
             ^          |   |   |         ^
             |      <---   v   --->      | Split? N
LEFT     0 ---  0.0   1.0  0.0  1.0   0.0 ---    0  RIGHT
                                                          STREET NAME:
THRU   658 ---> 1.1  (NO. OF LANES)   2.0<---  468  THRU  Wilbur

RIGHT  190 ---  1.1   0.0  0.0  0.0   1.0 ---  160  LEFT
             |      <---   ^   --->      |
             v          |   |   |        v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 SB Ramps
========================================================================
               ORIGINAL   ADJUSTED                  V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO        V/C
------------------------------------------------------------------------
SB  RIGHT (R)      90         90       1720     0.0523
    LEFT (L)      266        266       1720     0.1547     0.1547
------------------------------------------------------------------------
EB  RIGHT (R)     190        190       1720     0.1105
    THRU (T)      658        658       1720     0.3826
    T + R                    848       1720     0.4930     0.4930
------------------------------------------------------------------------
WB  THRU (T)      468        468       3440     0.1360
    LEFT (L)      160        160       1720     0.0930     0.0930
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                           0.74
     INTERSECTION LEVEL OF SERVICE:                               C
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 WITH RAMPS Mitigation                           11/01/06
========================================================================
INTERSECTION     4 SR 160 NB Ramps/Wilbur            Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0    0    0
                        |   |   |
             ^          |   |   |         ^
             |      <---   v   --->      | Split? N
LEFT   330 ---  1.0   0.0  0.0  0.0   1.1 ---  107  RIGHT
                                                          STREET NAME:
THRU   594 ---> 2.0  (NO. OF LANES)   2.1<---  578  THRU  Wilbur

RIGHT    0 ---  0.0   1.0  0.0  1.0   0.0 ---    0  LEFT
             |      <---   ^   --->      |
             v          |   |   |        v
  N                     |   |   |                         SIG WARRANTS:
W + E                  50    0  120                         Urb=B, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 NB Ramps
========================================================================
               ORIGINAL   ADJUSTED                  V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO        V/C
------------------------------------------------------------------------
NB  RIGHT (R)     120        120       1720     0.0698     0.0698
    LEFT (L)       50         50       1720     0.0291
------------------------------------------------------------------------
EB  THRU (T)      594        594       3440     0.1727
    LEFT (L)      330        330       1720     0.1919     0.1919
------------------------------------------------------------------------
WB  RIGHT (R)     107        107       1720     0.0622
    THRU (T)      578        578       3440     0.1680
    T + R                    685       3440     0.1991     0.1991
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                           0.46
     INTERSECTION LEVEL OF SERVICE:                               A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 WITH RAMPS Mitigation                           11/01/06
========================================================================
INTERSECTION     5 Bridgehead/Wilbur                 Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            50   30   10
                        |   |   |
             ^          |   |   |         ^
             |      <---   v   --->      | Split? N
LEFT    30 ---  1.0   1.1  1.1  1.1   1.1 ---   10  RIGHT
                                                          STREET NAME:
THRU   409 ---> 1.1  (NO. OF LANES)   1.1<---  439  THRU  Wilbur

RIGHT  275 ---  1.1   1.0  1.1  1.1   1.0 ---   30  LEFT
             |      <---   ^   --->      |
             v          |   |   |        v
  N                     |   |   |                         SIG WARRANTS:
W + E                 196   50   50                         Urb=B, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Bridgehead
========================================================================
               ORIGINAL   ADJUSTED                  V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO        V/C
------------------------------------------------------------------------
NB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)       50         50       1650     0.0303
    LEFT (L)      196        196       1650     0.1188     0.1188
    T + R                    100       1650     0.0606
------------------------------------------------------------------------
SB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)       30         30       1650     0.0182
    LEFT (L)       10         10       1650     0.0061
    T + R                     80       1650     0.0485
    T + L                     40       1650     0.0242
    T + R + L                 90       1650     0.0545     0.0545
------------------------------------------------------------------------
EB  RIGHT (R)     275        275       1650     0.1667
    THRU (T)      409        409       1650     0.2479
    LEFT (L)       30         30       1650     0.0182
    T + R                    684       1650     0.4145     0.4145
------------------------------------------------------------------------
WB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      439        439       1650     0.2661
    LEFT (L)       30         30       1650     0.0182     0.0182
    T + R                    449       1650     0.2721
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                           0.61
     INTERSECTION LEVEL OF SERVICE:                               B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 WITH RAMPS Mitigation                           11/01/06
========================================================================
INTERSECTION    15 Neroly/Oakley                     Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            20  363  177
                        |   |   |
             ^          |   |   |         ^
             |      <---   v   --->      | Split? N
LEFT    30 ---  1.0   1.1  1.1  1.0   1.1 ---  107  RIGHT
                                                          STREET NAME:
THRU   178 ---> 1.1  (NO. OF LANES)   1.1<---  109  THRU  Oakley

RIGHT  140 ---  1.1   1.0  1.1  1.1   1.0 ---   20  LEFT
             |      <---   ^   --->      |
             v          |   |   |        v
  N                     |   |   |                         SIG WARRANTS:
W + E                  60  243   20                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Neroly
========================================================================
               ORIGINAL   ADJUSTED                  V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO        V/C
------------------------------------------------------------------------
NB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)      243        243       1650     0.1473
    LEFT (L)       60         60       1650     0.0364     0.0364
    T + R                    263       1650     0.1594
------------------------------------------------------------------------
SB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)      363        363       1650     0.2200
    LEFT (L)      177        177       1650     0.1073
    T + R                    383       1650     0.2321     0.2321
------------------------------------------------------------------------
EB  RIGHT (R)     140        140       1650     0.0848
    THRU (T)      178        178       1650     0.1079
    LEFT (L)       30         30       1650     0.0182
    T + R                    318       1650     0.1927     0.1927
------------------------------------------------------------------------
WB  RIGHT (R)     107        107       1650     0.0648
    THRU (T)      109        109       1650     0.0661
    LEFT (L)       20         20       1650     0.0121     0.0121
    T + R                    216       1650     0.1309
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                           0.47
     INTERSECTION LEVEL OF SERVICE:                               A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 WITH RAMPS Mitigation                           11/01/06
========================================================================
INTERSECTION    16 Live Oak/Oakley                   Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            40  385  319
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    40 ---  1.0   1.1  1.1  1.0   1.1 ---  248  RIGHT
                                                          STREET NAME:
THRU   290 ---> 1.1  (NO. OF LANES)   1.1<---  210  THRU  Oakley

RIGHT   30 ---  1.1   1.0  1.1  1.1   1.0 ---   60  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  50  233   60                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO      V/C
------------------------------------------------------------------------
NB  RIGHT (R)      60         60       1650     0.0364
    THRU (T)      233        233       1650     0.1412
    LEFT (L)       50         50       1650     0.0303
    T + R                    293       1650     0.1776     0.1776
------------------------------------------------------------------------
SB  RIGHT (R)      40         40       1650     0.0242
    THRU (T)      385        385       1650     0.2333
    LEFT (L)      319        319       1650     0.1933     0.1933
    T + R                    425       1650     0.2576
------------------------------------------------------------------------
EB  RIGHT (R)      30         30       1650     0.0182
    THRU (T)      290        290       1650     0.1758
    LEFT (L)       40         40       1650     0.0242     0.0242
    T + R                    320       1650     0.1939
------------------------------------------------------------------------
WB  RIGHT (R)     248        248       1650     0.1503
    THRU (T)      210        210       1650     0.1273
    LEFT (L)       60         60       1650     0.0364
    T + R                    458       1650     0.2776     0.2776
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.67
     INTERSECTION LEVEL OF SERVICE:                             B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 WITH RAMPS Mitigation                           11/01/06
========================================================================
INTERSECTION    17 Empire/Oakley                     Oakley
Count Date                   Time                Peak Hour
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------           150  610  150
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? Y
LEFT   250 ---  2.1   1.1  2.1  1.0   1.0 ---   80  RIGHT
                                                          STREET NAME:
THRU    60 ---> 1.1  (NO. OF LANES)   1.1<---   50  THRU  Oakley

RIGHT  389 ---  1.5   1.0  2.1  1.1   1.1 ---   80  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 378  640   30                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO      V/C
------------------------------------------------------------------------
NB  RIGHT (R)      30         30       1650     0.0182
    THRU (T)      640        640       3300     0.1939
    LEFT (L)      378        378       1650     0.2291     0.2291
    T + R                    670       3300     0.2030
------------------------------------------------------------------------
SB  RIGHT (R)     150        150       1650     0.0909
    THRU (T)      610        610       3300     0.1848
    LEFT (L)      150        150       1650     0.0909
    T + R                    760       3300     0.2303     0.2303
------------------------------------------------------------------------
EB  RIGHT (R)     389         11 *     1650     0.0067
    THRU (T)       60         60       1650     0.0364
    LEFT (L)      250        250       3000     0.0833
    T + L                    310       3000     0.1033     0.1033
------------------------------------------------------------------------
WB  RIGHT (R)      80          0 *     1650     0.0000
    THRU (T)       50         50       1650     0.0303
    LEFT (L)       80         80       1650     0.0485
    T + L                    130       1650     0.0788     0.0788
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.64
     INTERSECTION LEVEL OF SERVICE:                             B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 WITH RAMPS Mitigation                           11/01/06
========================================================================
INTERSECTION    18 Empire Avenue/Main Street         Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------            30   20   30
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    40 ---  1.0   1.0  1.1  1.1   1.1 ---   20  RIGHT
                                                          STREET NAME:
THRU  1801 ---> 2.0  (NO. OF LANES)   2.1<--- 1178  THRU  Main Street

RIGHT  540 ---  1.5   2.0  1.0  1.5   2.0 ---  350  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 550   40  380                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Empire Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO      V/C
------------------------------------------------------------------------
NB  RIGHT (R)     380        188 *     1650     0.1139
    THRU (T)       40         40       1650     0.0242
    LEFT (L)      550        550       3000     0.1833     0.1833
------------------------------------------------------------------------
SB  RIGHT (R)      30          0 *     1650     0.0000
    THRU (T)       20         20       1650     0.0121
    LEFT (L)       30         30       1650     0.0182
    T + L                     50       1650     0.0303     0.0303
------------------------------------------------------------------------
EB  RIGHT (R)     540        238 *     1650     0.1442
    THRU (T)     1801       1801       3300     0.5458     0.5458
    LEFT (L)       40         40       1650     0.0242
------------------------------------------------------------------------
WB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)     1178       1178       3300     0.3570
    LEFT (L)      350        350       3000     0.1167     0.1167
    T + R                   1198       3300     0.3630
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.88
     INTERSECTION LEVEL OF SERVICE:                             D
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 WITH RAMPS Mitigation                           11/01/06
========================================================================
INTERSECTION    23 Live Oak/Neroly                   Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------            30  213  151
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? Y
LEFT    20 ---  1.1   1.1  1.1  1.0   1.1 ---  170  RIGHT
                                                          STREET NAME:
THRU   283 ---> 2.2  (NO. OF LANES)   2.2<---  213  THRU  Neroly

RIGHT  239 ---  1.1   1.0  1.1  1.1   1.1 ---  136  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  89  173   76                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO      V/C
------------------------------------------------------------------------
NB  RIGHT (R)      76         76       1650     0.0461
    THRU (T)      173        173       1650     0.1048
    LEFT (L)       89         89       1650     0.0539
    T + R                    249       1650     0.1509     0.1509
------------------------------------------------------------------------
SB  RIGHT (R)      30         30       1650     0.0182
    THRU (T)      213        213       1650     0.1291
    LEFT (L)      151        151       1650     0.0915     0.0915
    T + R                    243       1650     0.1473
------------------------------------------------------------------------
EB  RIGHT (R)     239        239       1650     0.1448
    THRU (T)      283        283       3300     0.0858
    LEFT (L)       20         20       1650     0.0121
    T + R                    522       3300     0.1582
    T + L                    303       3300     0.0918
    T + R + L                542       3300     0.1642     0.1642
------------------------------------------------------------------------
WB  RIGHT (R)     170        170       1650     0.1030
    THRU (T)      213        213       3300     0.0645
    LEFT (L)      136        136       1650     0.0824
    T + R                    383       3300     0.1161
    T + L                    349       3300     0.1058
    T + R + L                519       3300     0.1573     0.1573
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.56
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 WITH RAMPS Mitigation                           11/01/06
========================================================================
INTERSECTION    25 Empire/Laurel                     Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------           330  456  182
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   460 ---  2.0   1.0  2.0  1.0   1.1 ---  122  RIGHT
                                                          STREET NAME:
THRU  1537 ---> 2.0  (NO. OF LANES)   2.1<--- 1073  THRU  Laurel

RIGHT  310 ---  1.0   1.0  2.1  1.1   1.0 ---  110  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 160  525  120                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire
========================================================================
               ORIGINAL   ADJUSTED               V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     120        120       1650     0.0727
    THRU (T)      525        525       3300     0.1591
    LEFT (L)      160        160       1650     0.0970
    T + R                    645       3300     0.1955     0.1955
------------------------------------------------------------------------
SB  RIGHT (R)     330         77 *     1650     0.0467
    THRU (T)      456        456       3300     0.1382
    LEFT (L)      182        182       1650     0.1103     0.1103
------------------------------------------------------------------------
EB  RIGHT (R)     310        150 *     1650     0.0909
    THRU (T)     1537       1537       3300     0.4658     0.4658
    LEFT (L)      460        460       3000     0.1533
------------------------------------------------------------------------
WB  RIGHT (R)     122        122       1650     0.0739
    THRU (T)     1073       1073       3300     0.3252
    LEFT (L)      110        110       1650     0.0667     0.0667
    T + R                   1195       3300     0.3621
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.84
     INTERSECTION LEVEL OF SERVICE:                             D
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

Cumulative (2030) No Project AM
(Without Connector Ramps)

HCM Signalized Intersection Capacity Analysis
1: Wilbur Avenue & Minaker Drive

2030 AM no Ramps
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↰↑	↱		↰↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	0.98		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.97	1.00
Satd. Flow (prot)	1770	3474		1770	3532			1777	1583		1801	1583
Flt Permitted	0.95	1.00		0.95	1.00			0.72	1.00		0.82	1.00
Satd. Flow (perm)	1770	3474		1770	3532			1344	1583		1528	1583
Volume (vph)	20	360	50	30	810	10	140	5	20	10	5	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	379	53	32	853	11	147	5	21	11	5	21
RTOR Reduction (vph)	0	13	0	0	1	0	0	0	17	0	0	17
Lane Group Flow (vph)	21	419	0	32	863	0	0	152	4	0	16	4
Turn Type	Prot			Prot			Perm		Perm	Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		4
Actuated Green, G (s)	1.3	30.6		1.4	30.7			11.1	11.1		11.1	11.1
Effective Green, g (s)	1.3	30.6		1.4	30.7			11.1	11.1		11.1	11.1
Actuated g/C Ratio	0.02	0.56		0.03	0.56			0.20	0.20		0.20	0.20
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	42	1929		45	1968			271	319		308	319
v/s Ratio Prot	0.01	0.12		c0.02	c0.24							
v/s Ratio Perm								c0.11	0.00		0.01	0.00
v/c Ratio	0.50	0.22		0.71	0.44			0.56	0.01		0.05	0.01
Uniform Delay, d1	26.6	6.2		26.6	7.1			19.8	17.6		17.8	17.6
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	9.1	0.1		41.4	0.2			2.6	0.0		0.1	0.0
Delay (s)	35.6	6.3		68.0	7.3			22.5	17.6		17.8	17.6
Level of Service	D	A		E	A			C	B		B	B
Approach Delay (s)		7.6			9.5			21.9			17.7	
Approach LOS		A			A			C			B	

Intersection Summary			
HCM Average Control Delay	10.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	55.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
2: Wilbur Avenue & Viera Avenue

2030 AM no Ramps
11/6/2006

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱		↰	↑	↰↱	
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	390	30	20	820	70	60
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	411	32	21	863	74	63
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			442		1332	426
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			442		1332	426
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		56	90
cM capacity (veh/h)			1118		167	628

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	442	21	863	137
Volume Left	0	21	0	74
Volume Right	32	0	0	63
cSH	1700	1118	1700	253
Volume to Capacity	0.26	0.02	0.51	0.54
Queue Length 95th (ft)	0	1	0	74
Control Delay (s)	0.0	8.3	0.0	34.9
Lane LOS		A		D
Approach Delay (s)	0.0	0.2		34.9
Approach LOS				D

Intersection Summary			
Average Delay	3.4		
Intersection Capacity Utilization	57.4%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
3: Wilbur Avenue & SR 160 SB Off

2030 AM no Ramps
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱		↰	↑↑					↰		↱
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	340	90	240	640	0	0	0	0	220	0	140
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	358	95	253	674	0	0	0	0	232	0	147
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	674			453			1247	1584	405	1584	1632	337
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	674			453			1247	1584	405	1584	1632	337
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			77			100	100	100	0	100	78
cM capacity (veh/h)	913			1104			83	83	595	60	77	659

Direction, Lane #	EB 1	WB 1	WB 2	WB 3	SB 1	SB 2
Volume Total	453	253	337	337	232	147
Volume Left	0	253	0	0	232	0
Volume Right	95	0	0	0	0	147
cSH	1700	1104	1700	1700	60	659
Volume to Capacity	0.27	0.23	0.20	0.20	3.86	0.22
Queue Length 95th (ft)	0	22	0	0	Err	21
Control Delay (s)	0.0	9.2	0.0	0.0	Err	12.0
Lane LOS		A			F	B
Approach Delay (s)	0.0	2.5			6115.2	
Approach LOS					F	

Intersection Summary			
Average Delay	1319.6		
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
4: Wilbur Avenue & SR 160 NB On

2030 AM no Ramps
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑			↑↱		↰		↱			
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	80	480	0	0	690	250	190	0	230	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	84	505	0	0	726	263	200	0	242	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	989			505			1037	1663	253	1279	1532	495
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	989			505			1037	1663	253	1279	1532	495
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	88			100			0	100	68	100	100	100
cM capacity (veh/h)	694			1056			168	84	747	75	102	520

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2
Volume Total	84	253	253	484	505	200	242
Volume Left	84	0	0	0	0	200	0
Volume Right	0	0	0	0	263	0	242
cSH	694	1700	1700	1700	1700	168	747
Volume to Capacity	0.12	0.15	0.15	0.28	0.30	1.19	0.32
Queue Length 95th (ft)	10	0	0	0	0	272	35
Control Delay (s)	10.9	0.0	0.0	0.0	0.0	183.9	12.1
Lane LOS	B					F	B
Approach Delay (s)	1.6			0.0		89.8	
Approach LOS						F	

Intersection Summary			
Average Delay	20.1		
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
5: Wilbur Avenue & Bridgehead Road

2030 AM no Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	30	490	190	30	520	10	400	30	130	10	30	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	516	200	32	547	11	421	32	137	11	32	21

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1
Volume Total (vph)	32	716	589	589	63
Volume Left (vph)	32	0	32	421	11
Volume Right (vph)	0	200	11	137	21
Hadj (s)	0.53	-0.16	0.03	0.04	-0.13
Departure Headway (s)	8.5	7.8	7.5	7.4	9.4
Degree Utilization, x	0.07	1.54	1.23	1.22	0.16
Capacity (veh/h)	416	468	485	491	378
Control Delay (s)	10.9	274.7	145.8	139.4	14.2
Approach Delay (s)	263.6		145.8	139.4	14.2
Approach LOS	F		F	F	B

Intersection Summary			
Delay	184.0		
HCM Level of Service	F		
Intersection Capacity Utilization	97.5%	ICU Level of Service	F
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
6: E 18th Street & Hillcrest Avenue

2030 AM no Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↱		↰	↑	↱	↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3421		1770	3490		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3421		1770	3490		1770	1863	1583	1770	1863	1583
Volume (vph)	20	350	100	240	490	50	230	100	200	50	120	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	368	105	253	516	53	242	105	211	53	126	63
RTOR Reduction (vph)	0	33	0	0	9	0	0	0	151	0	0	53
Lane Group Flow (vph)	21	440	0	253	560	0	242	105	60	53	126	10
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases									8			4
Actuated Green, G (s)	0.7	15.4		10.9	26.1		10.2	16.5	16.5	2.7	8.5	8.5
Effective Green, g (s)	1.7	17.4		12.4	28.1		11.7	18.0	18.0	3.7	10.0	10.0
Actuated g/C Ratio	0.03	0.27		0.20	0.44		0.18	0.28	0.28	0.06	0.16	0.16
Clearance Time (s)	4.0	5.0		4.5	5.0		4.5	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	47	937		346	1544		326	528	449	103	293	249
v/s Ratio Prot	0.01	c0.13		c0.14	0.16		c0.14	0.06		0.03	c0.07	
v/s Ratio Perm									0.04			0.01
v/c Ratio	0.45	0.47		0.73	0.36		0.74	0.20	0.13	0.51	0.43	0.04
Uniform Delay, d1	30.4	19.2		24.0	11.8		24.5	17.3	16.9	29.0	24.2	22.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.6	0.4		7.7	0.1		8.8	0.2	0.1	4.3	1.0	0.1
Delay (s)	37.1	19.6		31.7	11.9		33.3	17.5	17.1	33.3	25.2	22.7
Level of Service	D	B		C	B		C	B	B	C	C	C
Approach Delay (s)		20.3			18.0			24.2			26.3	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM Average Control Delay	21.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	63.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
7: E 18th Street & Viera Avenue

2030 AM no Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑↱			↰↑	↱		✣	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	0.96			1.00	0.85		0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00		0.99	
Satd. Flow (prot)	1770	3539	1583	1770	3410			1788	1583		1689	
Flt Permitted	0.32	1.00	1.00	0.54	1.00			0.71	1.00		0.91	
Satd. Flow (perm)	602	3539	1583	1002	3410			1328	1583		1553	
Volume (vph)	110	340	60	20	560	180	150	30	40	30	20	80
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	116	358	63	21	589	189	158	32	42	32	21	84
RTOR Reduction (vph)	0	0	26	0	47	0	0	0	30	0	60	0
Lane Group Flow (vph)	116	358	37	21	731	0	0	190	12	0	77	0
Turn Type	Perm		Perm	Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	27.4	27.4	27.4	27.4	27.4			12.4	12.4		12.4	
Effective Green, g (s)	28.4	28.4	28.4	28.4	28.4			13.4	13.4		13.4	
Actuated g/C Ratio	0.59	0.59	0.59	0.59	0.59			0.28	0.28		0.28	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	358	2103	941	595	2026			372	444		435	
v/s Ratio Prot		0.10			c0.21							
v/s Ratio Perm	0.19		0.02	0.02				c0.14	0.01		0.05	
v/c Ratio	0.32	0.17	0.04	0.04	0.36			0.51	0.03		0.18	
Uniform Delay, d1	4.9	4.4	4.0	4.0	5.0			14.4	12.5		13.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.5	0.0	0.0	0.0	0.1			1.2	0.0		0.2	
Delay (s)	5.4	4.4	4.0	4.0	5.1			15.6	12.5		13.2	
Level of Service	A	A	A	A	A			B	B		B	
Approach Delay (s)		4.6			5.1			15.1			13.2	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	6.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	47.8	Sum of lost time (s)	6.0
Intersection Capacity Utilization	53.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: E 18th Street & Phillips Lane

2030 AM no Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑	↱	↰	↑↱		↰↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.97	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.90		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3523		1770	3539	1583	1770	1679		3433	1631	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3523		1770	3539	1583	1770	1679		3433	1631	
Volume (vph)	80	340	10	20	710	70	20	10	20	40	10	50
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	358	11	21	747	74	21	11	21	42	11	53
RTOR Reduction (vph)	0	3	0	0	0	47	0	17	0	0	43	0
Lane Group Flow (vph)	84	366	0	21	747	27	21	15	0	42	21	0
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	5	2		1	6		4	7		8	3	
Permitted Phases						6						
Actuated Green, G (s)	3.7	19.4		0.5	16.2	16.2	0.5	7.7		1.1	8.3	
Effective Green, g (s)	3.7	19.4		0.5	16.2	16.2	0.5	7.7		1.1	8.3	
Actuated g/C Ratio	0.08	0.43		0.01	0.36	0.36	0.01	0.17		0.02	0.19	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	147	1529		20	1283	574	20	289		84	303	
v/s Ratio Prot	c0.05	c0.10		0.01	c0.21		0.01	0.01		c0.01	c0.01	
v/s Ratio Perm						0.02						
v/c Ratio	0.57	0.24		1.05	0.58	0.05	1.05	0.05		0.50	0.07	
Uniform Delay, d1	19.7	8.0		22.1	11.5	9.2	22.1	15.4		21.5	15.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.3	0.1		217.8	0.7	0.0	217.8	0.1		4.6	0.1	
Delay (s)	25.0	8.1		239.9	12.2	9.3	239.9	15.5		26.1	15.1	
Level of Service	C	A		F	B	A	F	B		C	B	
Approach Delay (s)		11.2			17.6			104.4			19.5	
Approach LOS		B			B			F			B	

Intersection Summary			
HCM Average Control Delay	18.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	44.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	41.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
9: E 18th Street & SR 160 SB Off

2030 AM no Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰↰	↑↑	↱		↰	↱	↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85		1.00	0.85	1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1719	3370		3335	3438	1538		1729	1538	1719	1646	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.70	1.00	0.48	1.00	
Satd. Flow (perm)	1719	3370		3335	3438	1538		1269	1538	861	1646	
Volume (vph)	10	330	50	910	630	90	150	10	190	40	20	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	347	53	958	663	95	158	11	200	42	21	32
RTOR Reduction (vph)	0	11	0	0	0	28	0	0	0	0	27	0
Lane Group Flow (vph)	11	389	0	958	663	67	0	169	200	42	26	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot		Perm	Perm		Free	Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases						6	8		Free	4		
Actuated Green, G (s)	0.8	28.7		41.2	69.1	69.1		17.1	100.0	17.1	17.1	
Effective Green, g (s)	0.8	29.7		41.2	70.1	70.1		17.1	100.0	17.1	17.1	
Actuated g/C Ratio	0.01	0.30		0.41	0.70	0.70		0.17	1.00	0.17	0.17	
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0		4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	4.0	4.0		2.0		2.0	2.0	
Lane Grp Cap (vph)	14	1001		1374	2410	1078		217	1538	147	281	
v/s Ratio Prot	0.01	c0.12		c0.29	0.19						0.02	
v/s Ratio Perm						0.04		c0.13	0.13	0.05		
v/c Ratio	0.79	0.39		0.70	0.28	0.06		0.78	0.13	0.29	0.09	
Uniform Delay, d1	49.5	27.9		24.3	5.5	4.7		39.6	0.0	36.1	34.9	
Progression Factor	1.00	1.00		0.56	0.67	0.62		1.00	1.00	1.00	1.00	
Incremental Delay, d2	130.6	1.1		1.5	0.3	0.1		14.8	0.2	0.4	0.1	
Delay (s)	180.1	29.1		14.9	4.0	3.0		54.4	0.2	36.5	35.0	
Level of Service	F	C		B	A	A		D	A	D	C	
Approach Delay (s)		33.1			10.1			25.0			35.7	
Approach LOS		C			B			C			D	

Intersection Summary			
HCM Average Control Delay	16.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Main Street & SR 160 NB On

2030 AM no Ramps
11/6/2006

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↱		↰	↑↑↑	↰	↱↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		1.00	0.91	1.00	0.88
Frt	0.97		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	4781		1719	4940	1719	2707
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	4781		1719	4940	1719	2707
Volume (vph)	440	120	140	1480	150	1070
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	463	126	147	1558	158	1126
RTOR Reduction (vph)	43	0	0	0	0	68
Lane Group Flow (vph)	546	0	147	1558	158	1058
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Turn Type			Prot			pm+ov
Protected Phases	2		1	6	8	1
Permitted Phases						8
Actuated Green, G (s)	32.8		40.0	77.8	13.2	53.2
Effective Green, g (s)	33.8		41.0	78.8	13.2	54.2
Actuated g/C Ratio	0.34		0.41	0.79	0.13	0.54
Clearance Time (s)	5.0		5.0	5.0	4.0	5.0
Vehicle Extension (s)	4.0		3.0	4.0	2.0	3.0
Lane Grp Cap (vph)	1616		705	3893	227	1575
v/s Ratio Prot	0.11		0.09	c0.32	0.09	c0.28
v/s Ratio Perm						0.12
v/c Ratio	0.34		0.21	0.40	0.70	0.67
Uniform Delay, d1	24.7		19.0	3.3	41.5	16.5
Progression Factor	0.34		1.17	0.63	1.00	1.00
Incremental Delay, d2	0.6		0.1	0.3	7.3	1.1
Delay (s)	9.1		22.5	2.3	48.8	17.6
Level of Service	A		C	A	D	B
Approach Delay (s)	9.1			4.1	21.5	
Approach LOS	A			A	C	

Intersection Summary			
HCM Average Control Delay	11.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Main Street & Bridgehead Road

2030 AM no Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↑	↱	↰↰	↱		↰↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00	0.97	1.00		0.97	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	4830		1719	4940	1538	3335	1749		3335	1810	1538
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1719	4830		1719	4940	1538	3335	1749		3335	1810	1538
Volume (vph)	160	1150	200	80	1190	380	310	210	60	100	230	120
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	168	1211	211	84	1253	400	326	221	63	105	242	126
RTOR Reduction (vph)	0	20	0	0	0	236	0	12	0	0	0	108
Lane Group Flow (vph)	168	1402	0	84	1253	164	326	272	0	105	242	18
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot		Perm	Split			Split		Perm
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases						6						7
Actuated Green, G (s)	10.0	44.1		6.0	40.1	40.1	18.9	18.9		14.0	14.0	14.0
Effective Green, g (s)	10.0	45.1		6.0	41.1	41.1	18.9	18.9		14.0	14.0	14.0
Actuated g/C Ratio	0.10	0.45		0.06	0.41	0.41	0.19	0.19		0.14	0.14	0.14
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	172	2178		103	2030	632	630	331		467	253	215
v/s Ratio Prot	c0.10	c0.29		0.05	0.25		0.10	c0.16		0.03	c0.13	
v/s Ratio Perm						0.11						0.01
v/c Ratio	0.98	0.64		0.82	0.62	0.26	0.52	0.82		0.22	0.96	0.08
Uniform Delay, d1	44.9	21.2		46.5	23.2	19.4	36.5	38.9		38.2	42.7	37.4
Progression Factor	0.85	0.88		1.42	0.25	0.30	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	54.4	1.2		34.0	1.3	0.9	0.3	14.3		0.1	43.9	0.1
Delay (s)	92.6	19.9		99.7	7.2	6.8	36.8	53.3		38.3	86.6	37.5
Level of Service	F	B		F	A	A	D	D		D	F	D
Approach Delay (s)		27.6			11.6			44.4			62.8	
Approach LOS		C			B			D			E	

Intersection Summary			
HCM Average Control Delay	27.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	69.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Main Street & Sandy Lane

2030 AM no Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↱		↰	↑↑↑		↰		↱			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0		4.0			
Lane Util. Factor		0.91		1.00	0.91		1.00		1.00			
Frt		0.99		1.00	1.00		1.00		0.85			
Flt Protected		1.00		0.95	1.00		0.95		1.00			
Satd. Flow (prot)		4906		1719	4940		1719		1538			
Flt Permitted		1.00		0.95	1.00		0.95		1.00			
Satd. Flow (perm)		4906		1719	4940		1719		1538			
Volume (vph)	0	1250	60	50	1630	0	20	0	50	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1316	63	53	1716	0	21	0	53	0	0	0
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	51	0	0	0
Lane Group Flow (vph)	0	1377	0	53	1716	0	21	0	2	0	0	0
Heavy Vehicles (%)	2%	5%	5%	5%	5%	2%	5%	2%	5%	2%	2%	2%
Turn Type				Prot			Prot		custom			
Protected Phases		2		1	6		3					
Permitted Phases									8			
Actuated Green, G (s)		75.6		7.1	86.7		4.3		4.3			
Effective Green, g (s)		76.1		7.6	87.7		4.3		4.3			
Actuated g/C Ratio		0.76		0.08	0.88		0.04		0.04			
Clearance Time (s)		4.5		4.5	5.0		4.0		4.0			
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0			
Lane Grp Cap (vph)		3733		131	4332		74		66			
v/s Ratio Prot		0.28		0.03	c0.35		c0.01					
v/s Ratio Perm									0.00			
v/c Ratio		0.37		0.40	0.40		0.28		0.03			
Uniform Delay, d1		4.0		44.0	1.2		46.4		45.9			
Progression Factor		1.53		1.34	0.10		1.00		1.00			
Incremental Delay, d2		0.2		1.2	0.2		2.1		0.2			
Delay (s)		6.3		60.2	0.3		48.5		46.1			
Level of Service		A		E	A		D		D			
Approach Delay (s)		6.3			2.1			46.8			0.0	
Approach LOS		A			A			D			A	

Intersection Summary			
HCM Average Control Delay	4.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX B:
INTERSECTION LOS CALCULATION SHEETS

Existing Conditions

Near Term No Project Conditions

Near Term With Project Conditions

Cumulative No Project Conditions

Cumulative With Project Conditions

Cumulative No Project (Without Connector Ramps) Conditions

Cumulative With Project (Without Connector Ramps) Conditions

Existing AM

HCM Unsignalized Intersection Capacity Analysis

Existing AM

1: Wilbur Avenue & Minaker Drive

11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			✣			↲	↱
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	14	102	34	8	504	10	90	3	13	9	2	18
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	15	106	35	8	525	10	94	3	14	9	2	19
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	535			142			452	705	71	644	718	268
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	535			142			452	705	71	644	718	268
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			80	99	99	97	99	97
cM capacity (veh/h)	1029			1439			469	352	977	345	346	730

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	15	71	71	8	350	185	110	11	19
Volume Left	15	0	0	8	0	0	94	9	0
Volume Right	0	0	35	0	0	10	14	0	19
cSH	1029	1700	1700	1439	1700	1700	496	345	730
Volume to Capacity	0.01	0.04	0.04	0.01	0.21	0.11	0.22	0.03	0.03
Queue Length 95th (ft)	1	0	0	0	0	0	21	3	2
Control Delay (s)	8.6	0.0	0.0	7.5	0.0	0.0	14.3	15.8	10.1
Lane LOS	A			A			B	C	B
Approach Delay (s)	0.8			0.1			14.3	12.2	
Approach LOS							B	B	

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	33.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis

Existing AM

2: Wilbur Avenue & Viera Avenue

11/6/2006

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱		↰	↑	↰↱	
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	123	9	4	504	46	8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	134	10	4	548	50	9
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			143		695	139
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			143		695	139
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		88	99
cM capacity (veh/h)			1439		407	910

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	143	4	548	59
Volume Left	0	4	0	50
Volume Right	10	0	0	9
cSH	1700	1439	1700	443
Volume to Capacity	0.08	0.00	0.32	0.13
Queue Length 95th (ft)	0	0	0	11
Control Delay (s)	0.0	7.5	0.0	14.4
Lane LOS		A		B
Approach Delay (s)	0.0	0.1		14.4
Approach LOS				B

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	36.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis

Existing AM

3: Wilbur Avenue & SR 160 SB Off

11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱		↰	↑↑					↰		↱
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	121	27	9	453	0	0	0	0	44	0	135
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	125	28	9	467	0	0	0	0	45	0	139
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	467			153			391	624	139	624	638	234
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	467			153			391	624	139	624	638	234
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	100	100	88	100	82
cM capacity (veh/h)	1091			1426			442	398	884	368	390	768

Direction, Lane #	EB 1	WB 1	WB 2	WB 3	SB 1	SB 2
Volume Total	153	9	234	234	45	139
Volume Left	0	9	0	0	45	0
Volume Right	28	0	0	0	0	139
cSH	1700	1426	1700	1700	368	768
Volume to Capacity	0.09	0.01	0.14	0.14	0.12	0.18
Queue Length 95th (ft)	0	0	0	0	10	16
Control Delay (s)	0.0	7.5	0.0	0.0	16.2	10.7
Lane LOS		A			C	B
Approach Delay (s)	0.0	0.1			12.1	
Approach LOS					B	

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	30.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis

Existing AM

4: Wilbur Avenue & SR 160 NB On

11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑			↑↱		↰		↱			
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	26	139	0	0	414	74	35	0	24	0	0	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	28	148	0	0	440	79	37	0	26	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	519			148			423	722	74	609	683	260
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	519			148			423	722	74	609	683	260
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			100			93	100	97	100	100	100
cM capacity (veh/h)	1043			1431			504	342	973	362	360	739

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2
Volume Total	28	74	74	294	226	37	26
Volume Left	28	0	0	0	0	37	0
Volume Right	0	0	0	0	79	0	26
cSH	1043	1700	1700	1700	1700	504	973
Volume to Capacity	0.03	0.04	0.04	0.17	0.13	0.07	0.03
Queue Length 95th (ft)	2	0	0	0	0	6	2
Control Delay (s)	8.5	0.0	0.0	0.0	0.0	12.7	8.8
Lane LOS	A					B	A
Approach Delay (s)	1.3			0.0		11.1	
Approach LOS						B	

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	30.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis

Existing AM

5: Wilbur Avenue & Bridgehead Road

11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↱			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	24	0	139	0	0	0	475	31	3	0	16	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	0	151	0	0	0	516	34	3	0	17	14

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1
Volume Total (vph)	26	151	0	553	32
Volume Left (vph)	26	0	0	516	0
Volume Right (vph)	0	151	0	3	14
Hadj (s)	0.53	-0.67	0.00	0.22	-0.23
Departure Headway (s)	6.5	5.3	5.8	4.6	4.8
Degree Utilization, x	0.05	0.22	0.00	0.71	0.04
Capacity (veh/h)	514	628	559	756	692
Control Delay (s)	8.6	8.5	8.8	18.3	8.0
Approach Delay (s)	8.5		0.0	18.3	8.0
Approach LOS	A		A	C	A

Intersection Summary			
Delay	15.6		
HCM Level of Service	C		
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis

Existing AM

6: E 18th Street & Hillcrest Avenue

11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↱		↖	↑↱		↖	↑	↗	↖	↑	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3371		1770	3505		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3371		1770	3505		1770	1863	1583	1770	1863	1583
Volume (vph)	13	118	55	124	411	28	181	84	111	26	68	46
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	14	131	61	138	457	31	201	93	123	29	76	51
RTOR Reduction (vph)	0	36	0	0	3	0	0	0	100	0	0	44
Lane Group Flow (vph)	14	156	0	138	485	0	201	93	23	29	76	7
Turn Type	Prot			Prot			Split		Perm	Split		Perm
Protected Phases	1	6		5	2		8	8		4	4	
Permitted Phases									8			4
Actuated Green, G (s)	1.2	22.0		9.2	31.0		11.3	11.3	11.3	7.4	7.4	7.4
Effective Green, g (s)	2.2	24.0		10.7	32.5		12.8	12.8	12.8	8.9	8.9	8.9
Actuated g/C Ratio	0.03	0.35		0.16	0.48		0.19	0.19	0.19	0.13	0.13	0.13
Clearance Time (s)	4.0	5.0		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	57	1183		277	1665		331	349	296	230	242	206
v/s Ratio Prot	0.01	0.05		c0.08	c0.14		c0.11	0.05		0.02	c0.04	
v/s Ratio Perm									0.01			0.00
v/c Ratio	0.25	0.13		0.50	0.29		0.61	0.27	0.08	0.13	0.31	0.03
Uniform Delay, d1	32.3	15.1		26.4	10.9		25.5	23.8	22.9	26.3	27.0	26.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.2	0.1		1.4	0.1		3.1	0.4	0.1	0.2	0.7	0.1
Delay (s)	34.5	15.2		27.8	11.0		28.6	24.2	23.0	26.6	27.7	26.1
Level of Service	C	B		C	B		C	C	C	C	C	C
Approach Delay (s)		16.5			14.7			26.0			27.0	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM Average Control Delay	19.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	68.4	Sum of lost time (s)	9.0
Intersection Capacity Utilization	42.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

Existing AM

7: E 18th Street & Viera Avenue

11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↑	↗	↖	↱			↰	↗		✣	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0		3.0			3.0	3.0		3.0	
Lane Util. Factor	1.00	0.95	1.00		1.00			1.00	1.00		1.00	
Frt	1.00	1.00	0.85		0.96			1.00	0.85		0.91	
Flt Protected	0.95	1.00	1.00		1.00			0.96	1.00		0.99	
Satd. Flow (prot)	1770	3539	1583		1784			1787	1583		1692	
Flt Permitted	0.25	1.00	1.00		1.00			0.75	1.00		0.97	
Satd. Flow (perm)	466	3539	1583		1784			1392	1583		1653	
Volume (vph)	20	163	31	0	377	147	115	21	2	8	16	43
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	22	181	34	0	419	163	128	23	2	9	18	48
RTOR Reduction (vph)	0	0	19	0	34	0	0	0	1	0	28	0
Lane Group Flow (vph)	22	181	15	0	548	0	0	151	1	0	47	0
Turn Type	Perm		Perm	Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	16.6	16.6	16.6		16.6			15.4	15.4		15.4	
Effective Green, g (s)	17.6	17.6	17.6		17.6			16.4	16.4		16.4	
Actuated g/C Ratio	0.44	0.44	0.44		0.44			0.41	0.41		0.41	
Clearance Time (s)	4.0	4.0	4.0		4.0			4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	205	1557	697		785			571	649		678	
v/s Ratio Prot		0.05			c0.31							
v/s Ratio Perm	0.05		0.01					c0.11	0.00		0.03	
v/c Ratio	0.11	0.12	0.02		0.70			0.26	0.00		0.07	
Uniform Delay, d1	6.6	6.6	6.3		9.1			7.8	7.0		7.2	
Progression Factor	1.00	1.00	1.00		1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.2	0.0	0.0		2.7			1.1	0.0		0.2	
Delay (s)	6.8	6.6	6.3		11.8			8.9	7.0		7.4	
Level of Service	A	A	A		B			A	A		A	
Approach Delay (s)		6.6			11.8			8.9			7.4	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	49.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

Existing AM

8: E 18th Street & Phillips Lane

11/6/2006

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	↖↗	
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	123	2	9	342	5	10
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	137	2	10	380	6	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			139		538	138
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			139		538	138
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		99	99
cM capacity (veh/h)			1445		501	911

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	139	390	17
Volume Left	0	10	6
Volume Right	2	0	11
cSH	1700	1445	715
Volume to Capacity	0.08	0.01	0.02
Queue Length 95th (ft)	0	1	2
Control Delay (s)	0.0	0.3	10.2
Lane LOS		A	B
Approach Delay (s)	0.0	0.3	10.2
Approach LOS			B

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	35.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
9: E 18th Street & SR 160 SB Off

Existing AM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰↰	↑↑	↱	↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.86		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3391		3335	3438	1538	1719	1562		1719	1650	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	1.00	1.00		1.00	1.00	
Satd. Flow (perm)	1719	3391		3335	3438	1538	1810	1562		1810	1650	
Volume (vph)	10	170	17	1012	337	57	9	6	59	25	11	16
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	11	181	18	1077	359	61	10	6	63	27	12	17
RTOR Reduction (vph)	0	7	0	0	0	20	0	60	0	0	16	0
Lane Group Flow (vph)	11	192	0	1077	359	41	10	9	0	27	13	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases						6	8			4		
Actuated Green, G (s)	0.9	12.6		20.8	32.0	32.0	3.1	3.1		3.1	3.1	
Effective Green, g (s)	0.9	12.6		20.3	32.0	32.0	2.6	2.6		2.6	2.6	
Actuated g/C Ratio	0.02	0.27		0.43	0.67	0.67	0.05	0.05		0.05	0.05	
Clearance Time (s)	4.0	4.0		3.5	4.0	4.0	3.5	3.5		3.5	3.5	
Vehicle Extension (s)	3.0	3.0		3.0	4.0	4.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	33	900		1425	2316	1036	99	85		99	90	
v/s Ratio Prot	0.01	c0.06		c0.32	0.10			0.01			0.01	
v/s Ratio Perm						0.03	0.01			c0.01		
v/c Ratio	0.33	0.21		0.76	0.16	0.04	0.10	0.11		0.27	0.14	
Uniform Delay, d1	23.0	13.6		11.5	2.8	2.6	21.3	21.4		21.5	21.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.9	0.1		2.3	0.0	0.0	0.2	0.2		0.5	0.3	
Delay (s)	28.9	13.7		13.8	2.9	2.6	21.5	21.6		22.1	21.7	
Level of Service	C	B		B	A	A	C	C		C	C	
Approach Delay (s)		14.5			10.8			21.6			21.9	
Approach LOS		B			B			C			C	

Intersection Summary				
HCM Average Control Delay	12.0		HCM Level of Service	B
HCM Volume to Capacity ratio	0.53			
Actuated Cycle Length (s)	47.5		Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.2%		ICU Level of Service	A
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Main Street & SR 160 NB On

Existing AM
11/6/2006

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↱		↰	↑↑	↰	↱↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	1.00	0.88
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3388		1719	3438	1719	2707
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3388		1719	3438	1719	2707
Volume (vph)	229	25	48	1347	59	743
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	252	27	53	1480	65	816
RTOR Reduction (vph)	6	0	0	0	0	632
Lane Group Flow (vph)	273	0	53	1480	65	184
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Turn Type			Prot			pm+ov
Protected Phases	2		1	6	8	1
Permitted Phases						8
Actuated Green, G (s)	64.9		16.2	84.1	7.4	23.6
Effective Green, g (s)	65.4		15.2	84.6	7.4	22.6
Actuated g/C Ratio	0.65		0.15	0.85	0.07	0.23
Clearance Time (s)	4.5		3.0	4.5	4.0	3.0
Vehicle Extension (s)	4.0		3.0	4.0	2.0	3.0
Lane Grp Cap (vph)	2216		261	2909	127	720
v/s Ratio Prot	0.08		0.03	c0.43	c0.04	0.04
v/s Ratio Perm						0.03
v/c Ratio	0.12		0.20	0.51	0.51	0.26
Uniform Delay, d1	6.5		37.1	2.1	44.6	31.8
Progression Factor	1.00		0.68	3.21	1.00	1.00
Incremental Delay, d2	0.1		0.3	0.5	1.4	0.2
Delay (s)	6.6		25.5	7.2	46.0	32.0
Level of Service	A		C	A	D	C
Approach Delay (s)	6.6			7.8	33.0	
Approach LOS	A			A	C	

Intersection Summary				
HCM Average Control Delay	15.9		HCM Level of Service	B
HCM Volume to Capacity ratio	0.51			
Actuated Cycle Length (s)	100.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.6%		ICU Level of Service	A
Analysis Period (min)	15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Main Street & Bridgehead Road

Existing AM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑↑	↱	↰	↱		↰	↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.91	1.00	1.00	1.00		0.95	0.95	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (prot)	1719	3318		1719	4940	1538	1719	1759		1633	1679	1538
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (perm)	1719	3318		1719	4940	1538	1719	1759		1633	1679	1538
Volume (vph)	59	688	208	17	1001	348	347	146	33	160	60	64
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	64	748	226	18	1088	378	377	159	36	174	65	70
RTOR Reduction (vph)	0	24	0	0	0	217	0	8	0	0	0	61
Lane Group Flow (vph)	64	950	0	18	1088	161	377	187	0	116	123	9
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot		Perm	Split			Split		Perm
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases						6						7
Actuated Green, G (s)	8.3	46.2		3.6	41.5	41.5	22.0	22.0		13.2	13.2	13.2
Effective Green, g (s)	7.3	47.2		2.6	42.5	42.5	21.5	21.5		12.7	12.7	12.7
Actuated g/C Ratio	0.07	0.47		0.03	0.42	0.42	0.22	0.22		0.13	0.13	0.13
Clearance Time (s)	3.0	5.0		3.0	5.0	5.0	3.5	3.5		3.5	3.5	3.5
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	125	1566		45	2100	654	370	378		207	213	195
v/s Ratio Prot	0.04	c0.29		0.01	c0.22		c0.22	0.11		0.07	c0.07	
v/s Ratio Perm						0.10						0.01
v/c Ratio	0.51	0.61		0.40	0.52	0.25	1.02	0.50		0.56	0.58	0.05
Uniform Delay, d1	44.6	19.5		47.9	21.2	18.5	39.2	34.5		41.0	41.1	38.3
Progression Factor	1.00	1.02		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.3	1.5		2.1	0.9	0.9	51.7	0.4		2.1	2.4	0.0
Delay (s)	45.7	21.6		50.0	22.1	19.4	90.9	34.9		43.1	43.5	38.4
Level of Service	D	C		D	C	B	F	C		D	D	D
Approach Delay (s)		23.0			21.8			71.8			42.2	
Approach LOS		C			C			E			D	

Intersection Summary				
HCM Average Control Delay	32.4		HCM Level of Service	C
HCM Volume to Capacity ratio	0.69			
Actuated Cycle Length (s)	100.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.2%		ICU Level of Service	D
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
12: Main Street & Sandy Lane

Existing AM
11/6/2006

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↱		↰	↑↑	↰↱	
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	859	4	4	1371	4	2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	954	4	4	1523	4	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					TWLTL	
Median storage veh)					0	
Upstream signal (ft)	1017					
pX, platoon unblocked			0.86		0.86	0.86
vC, conflicting volume			959		1727	479
vC1, stage 1 conf vol					957	
vC2, stage 2 conf vol					771	
vCu, unblocked vol			789		1683	231
tC, single (s)			4.2		6.9	7.0
tC, 2 stage (s)					5.9	
tF (s)			2.2		3.5	3.3
p0 queue free %			99		97	100
cM capacity (veh/h)			694		151	655

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	636	323	4	762	762	7
Volume Left	0	0	4	0	0	4
Volume Right	0	4	0	0	0	2
cSH	1700	1700	694	1700	1700	203
Volume to Capacity	0.37	0.19	0.01	0.45	0.45	0.03
Queue Length 95th (ft)	0	0	0	0	0	3
Control Delay (s)	0.0	0.0	10.2	0.0	0.0	23.3
Lane LOS			B			C
Approach Delay (s)	0.0		0.0			23.3
Approach LOS						C

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	47.9%		ICU Level of Service	A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis — Existing AM
13: Main Street & Live Oak Ave — 11/6/2006

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↱		↰	↑↑	↰	↱
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	830	27	19	1335	34	18
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	922	30	21	1483	38	20
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						5
Median type				TWLTL		
Median storage veh)					0	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			952		1721	476
vC1, stage 1 conf vol					937	
vC2, stage 2 conf vol					784	
vCu, unblocked vol			952		1721	476
tC, single (s)			4.2		6.9	7.0
tC, 2 stage (s)					5.9	
tF (s)			2.2		3.5	3.3
p0 queue free %			97		74	96
cM capacity (veh/h)			699		148	527

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	615	337	21	742	742	58
Volume Left	0	0	21	0	0	38
Volume Right	0	30	0	0	0	20
cSH	1700	1700	699	1700	1700	226
Volume to Capacity	0.36	0.20	0.03	0.44	0.44	0.26
Queue Length 95th (ft)	0	0	2	0	0	25
Control Delay (s)	0.0	0.0	10.3	0.0	0.0	28.7
Lane LOS			B			D
Approach Delay (s)	0.0		0.1			28.7
Approach LOS						D

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis — Existing AM
14: Main Street & Big Break Road — 11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↑↱			↰↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.97	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1650			1758	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.70	1.00			0.79	1.00
Satd. Flow (perm)	1719	3438	1538	1719	3438	1538	1262	1650			1435	1538
Volume (vph)	74	753	31	48	1135	51	57	18	26	51	36	182
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	78	793	33	51	1195	54	60	19	27	54	38	192
RTOR Reduction (vph)	0	0	12	0	0	18	0	24	0	0	0	168
Lane Group Flow (vph)	78	793	21	51	1195	36	60	22	0	0	92	24
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		4
Actuated Green, G (s)	4.6	32.8	32.8	2.7	30.9	30.9	7.4	7.4			7.4	7.4
Effective Green, g (s)	3.6	33.8	33.8	1.7	31.9	31.9	6.9	6.9			6.9	6.9
Actuated g/C Ratio	0.07	0.62	0.62	0.03	0.59	0.59	0.13	0.13			0.13	0.13
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.5	3.5			3.5	3.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)	114	2136	956	54	2016	902	160	209			182	195
v/s Ratio Prot	c0.05	0.23		0.03	c0.35			0.01				
v/s Ratio Perm			0.01			0.02	0.05				c0.06	0.02
v/c Ratio	0.68	0.37	0.02	0.94	0.59	0.04	0.38	0.11			0.51	0.12
Uniform Delay, d1	24.8	5.1	4.0	26.3	7.1	4.8	21.8	21.0			22.2	21.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	12.7	0.0	0.0	100.6	0.3	0.0	0.5	0.1			0.8	0.1
Delay (s)	37.5	5.1	4.0	126.9	7.4	4.8	22.3	21.1			23.0	21.2
Level of Service	D	A	A	F	A	A	C	C			C	C
Approach Delay (s)		7.9			12.0			21.8			21.8	
Approach LOS		A			B			C			C	

Intersection Summary			
HCM Average Control Delay	12.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	54.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis — Existing AM
15: Oakley Road & Neroly Road — 11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	9	21	23	3	68	145	60	297	4	44	174	6
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	10	23	25	3	75	159	66	326	4	48	191	7

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	58	237	397	246
Volume Left (vph)	10	3	66	48
Volume Right (vph)	25	159	4	7
Hadj (s)	-0.19	-0.37	0.06	0.06
Departure Headway (s)	5.9	5.3	5.2	5.4
Degree Utilization, x	0.10	0.35	0.57	0.37
Capacity (veh/h)	503	610	660	624
Control Delay (s)	9.5	11.2	14.9	11.5
Approach Delay (s)	9.5	11.2	14.9	11.5
Approach LOS	A	B	B	B

Intersection Summary			
Delay	12.7		
HCM Level of Service	B		
Intersection Capacity Utilization	44.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis — Existing AM
16: Oakley Road & Live Oak Ave — 11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	1	61	11	19	147	9	56	35	8	6	23	2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	1	68	12	21	163	10	62	39	9	7	26	2

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	81	194	110	34
Volume Left (vph)	1	21	62	7
Volume Right (vph)	12	10	9	2
Hadj (s)	-0.05	0.02	0.10	0.03
Departure Headway (s)	4.4	4.4	4.7	4.7
Degree Utilization, x	0.10	0.24	0.14	0.05
Capacity (veh/h)	778	787	724	706
Control Delay (s)	7.9	8.7	8.5	7.9
Approach Delay (s)	7.9	8.7	8.5	7.9
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.4		
HCM Level of Service	A		
Intersection Capacity Utilization	34.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
17: Oakley Road & Empire Avenue

Existing AM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↑	↱		↰↑	↱	↰	↑↑↱		↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95		1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1708	1583		1804	1583	1770	3534		1770	1863	1583
Flt Permitted	0.95	0.97	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1708	1583		1804	1583	1770	3534		1770	1863	1583
Volume (vph)	45	7	90	12	6	15	165	369	4	41	250	52
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	49	8	98	13	7	16	179	401	4	45	272	57
RTOR Reduction (vph)	0	0	91	0	0	15	0	0	0	0	0	31
Lane Group Flow (vph)	28	29	7	0	20	1	179	405	0	45	272	26
Turn Type	Split		Perm	Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8						6
Actuated Green, G (s)	4.7	4.7	4.7		2.6	2.6	10.6	37.1		1.8	28.3	28.3
Effective Green, g (s)	4.7	4.7	4.7		3.6	3.6	11.6	38.1		2.8	29.3	29.3
Actuated g/C Ratio	0.07	0.07	0.07		0.06	0.06	0.18	0.58		0.04	0.45	0.45
Clearance Time (s)	4.0	4.0	4.0		5.0	5.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	121	123	114		100	87	315	2065		76	837	711
v/s Ratio Prot	0.02	c0.02			c0.01		c0.10	0.11		0.03	c0.15	
v/s Ratio Perm			0.00			0.00						0.02
v/c Ratio	0.23	0.24	0.06		0.20	0.01	0.57	0.20		0.59	0.32	0.04
Uniform Delay, d1	28.5	28.6	28.2		29.4	29.1	24.5	6.4		30.6	11.6	10.0
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.0	1.0	0.2		1.0	0.0	2.3	0.0		11.8	0.2	0.0
Delay (s)	29.5	29.5	28.4		30.4	29.2	26.9	6.4		42.4	11.8	10.1
Level of Service	C	C	C		C	C	C	A		D	B	B
Approach Delay (s)		28.8			29.9			12.7			15.2	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	16.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	65.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	40.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: Main Street & Charles Way

Existing AM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑↱		↰↰	↑	↱		↰↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.99	1.00
Satd. Flow (prot)	1719	3539	1538	1770	3537		3335	1810	1583		1803	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.99	1.00
Satd. Flow (perm)	1719	3539	1538	1770	3537		3335	1810	1583		1803	1538
Volume (vph)	10	666	175	119	775	3	323	4	102	10	49	30
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	11	740	194	132	861	3	359	4	113	11	54	33
RTOR Reduction (vph)	0	0	124	0	0	0	0	0	89	0	0	31
Lane Group Flow (vph)	11	740	70	132	864	0	359	4	24	0	65	2
Heavy Vehicles (%)	5%	2%	5%	2%	2%	2%	5%	5%	2%	2%	5%	5%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	1.0	24.2	24.2	8.3	31.5		13.6	13.6	13.6		4.5	4.5
Effective Green, g (s)	2.0	25.2	25.2	9.3	32.5		14.6	14.6	14.6		4.5	4.5
Actuated g/C Ratio	0.03	0.36	0.36	0.13	0.47		0.21	0.21	0.21		0.06	0.06
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	49	1281	557	237	1652		700	380	332		117	99
v/s Ratio Prot	0.01	c0.21		c0.07	0.24		c0.11	0.00			c0.04	
v/s Ratio Perm			0.05						0.01			0.00
v/c Ratio	0.22	0.58	0.13	0.56	0.52		0.51	0.01	0.07		0.56	0.02
Uniform Delay, d1	33.0	17.9	14.8	28.2	13.1		24.4	21.8	22.1		31.6	30.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	2.3	0.6	0.1	2.8	0.3		0.6	0.0	0.1		5.6	0.1
Delay (s)	35.4	18.5	14.9	31.0	13.4		25.0	21.8	22.2		37.2	30.6
Level of Service	D	B	B	C	B		C	C	C		D	C
Approach Delay (s)		18.0			15.7			24.3			35.0	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM Average Control Delay	19.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	69.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	50.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
19: Main Street & Vintage Parkway

Existing AM
11/6/2006

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑	↑↑↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3480		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3539	3480		1770	1583
Volume (vph)	68	759	728	91	200	117
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	76	843	809	101	222	130
RTOR Reduction (vph)	0	0	9	0	0	105
Lane Group Flow (vph)	76	843	901	0	222	25
Turn Type	Prot					Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	5.0	37.1	28.1		10.9	10.9
Effective Green, g (s)	5.0	38.1	29.1		10.9	10.9
Actuated g/C Ratio	0.09	0.67	0.51		0.19	0.19
Clearance Time (s)	4.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	155	2366	1777		338	303
v/s Ratio Prot	c0.04	0.24	c0.26		c0.13	
v/s Ratio Perm						0.02
v/c Ratio	0.49	0.36	0.51		0.66	0.08
Uniform Delay, d1	24.8	4.1	9.2		21.3	18.9
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	2.4	0.1	0.2		4.6	0.1
Delay (s)	27.2	4.2	9.4		25.9	19.1
Level of Service	C	A	A		C	B
Approach Delay (s)		6.1	9.4		23.4	
Approach LOS		A	A		C	

Intersection Summary			
HCM Average Control Delay	10.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	57.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: Main Street & O'Hara Avenue

Existing AM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑↱			↰↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85			0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1770	1863	1583	1770	1862		1770	1583			1678	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.75	1.00			0.92	
Satd. Flow (perm)	1770	1863	1583	1770	1862		1405	1583			1575	
Volume (vph)	1	912	46	17	764	1	52	0	20	2	0	3
Peak-hour factor, PHF	0.92	0.90	0.90	0.90	0.90	0.92	0.90	0.92	0.90	0.92	0.92	0.92
Adj. Flow (vph)	1	1013	51	19	849	1	58	0	22	2	0	3
RTOR Reduction (vph)	0	0	12	0	0	0	0	20	0	0	3	0
Lane Group Flow (vph)	1	1013	39	19	850	0	58	2	0	0	2	0
Turn Type	Prot		Perm	Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4				2			6		
Actuated Green, G (s)	0.8	75.3	75.3	1.7	76.2		8.6	8.6			9.1	
Effective Green, g (s)	0.8	76.3	76.3	1.7	77.2		9.1	9.1			9.1	
Actuated g/C Ratio	0.01	0.77	0.77	0.02	0.78		0.09	0.09			0.09	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		4.5	4.5			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	14	1434	1219	30	1451		129	145			145	
v/s Ratio Prot	0.00	c0.54		c0.01	0.46			0.00				
v/s Ratio Perm			0.02				c0.04				0.00	
v/c Ratio	0.07	0.71	0.03	0.63	0.59		0.45	0.01			0.02	
Uniform Delay, d1	48.8	5.8	2.7	48.4	4.5		42.6	40.9			40.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	2.2	1.6	0.0	36.3	0.6		2.5	0.0			0.0	
Delay (s)	50.9	7.4	2.7	84.7	5.1		45.1	41.0			41.0	
Level of Service	D	A	A	F	A		D	D			D	
Approach Delay (s)		7.2			6.8			44.0			41.0	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM Average Control Delay	8.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	99.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
21: Cypress Road & Empire Avenue

Existing AM
11/6/2006

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↱		↰	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3466		1770	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	3466		1770	3539
Volume (vph)	83	217	306	49	74	292
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	92	241	340	54	82	324
RTOR Reduction (vph)	0	196	19	0	0	0
Lane Group Flow (vph)	92	45	375	0	82	324
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	7.2	7.2	16.0		4.1	24.1
Effective Green, g (s)	7.7	7.7	17.0		4.1	25.1
Actuated g/C Ratio	0.19	0.19	0.42		0.10	0.62
Clearance Time (s)	4.5	4.5	5.0		4.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	334	299	1444		178	2177
v/s Ratio Prot	c0.05		c0.11		c0.05	0.09
v/s Ratio Perm		0.03				
v/c Ratio	0.28	0.15	0.26		0.46	0.15
Uniform Delay, d1	14.2	13.8	7.8		17.3	3.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.5	0.2	0.1		1.9	0.0
Delay (s)	14.6	14.1	7.9		19.2	3.4
Level of Service	B	B	A		B	A
Approach Delay (s)	14.2		7.9			6.6
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	9.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	40.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	30.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
22: Cypress Road & Main Street

Existing AM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.71	1.00	1.00	0.69	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1330	1863	1583	1285	1863	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	37	92	60	97	59	278	27	401	95	327	488	4
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	41	102	67	108	66	309	30	446	106	363	542	4
RTOR Reduction (vph)	0	0	56	0	0	260	0	0	60	0	0	1
Lane Group Flow (vph)	41	102	11	108	66	49	30	446	46	363	542	3
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	12.7	12.7	12.7	12.7	12.7	12.7	2.7	34.7	34.7	20.2	52.2	52.2
Effective Green, g (s)	12.7	12.7	12.7	12.7	12.7	12.7	2.7	34.7	34.7	20.2	52.2	52.2
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.16	0.16	0.03	0.44	0.44	0.25	0.66	0.66
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	212	297	253	205	297	253	60	1543	690	449	2321	1038
v/s Ratio Prot		0.05			0.04		0.02	c0.13		c0.21	0.15	
v/s Ratio Perm	0.03		0.01	c0.08		0.03			0.03			0.00
v/c Ratio	0.19	0.34	0.04	0.53	0.22	0.19	0.50	0.29	0.07	0.81	0.23	0.00
Uniform Delay, d1	29.0	29.7	28.3	30.7	29.1	29.0	37.8	14.5	13.0	27.9	5.6	4.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.7	0.1	2.4	0.4	0.4	6.4	0.5	0.2	10.3	0.2	0.0
Delay (s)	29.5	30.4	28.4	33.1	29.5	29.4	44.2	15.0	13.2	38.2	5.8	4.7
Level of Service	C	C	C	C	C	C	D	B	B	D	A	A
Approach Delay (s)		29.6			30.2			16.2			18.7	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	21.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	79.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
25: Laurel Road & Empire Avenue

Existing AM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			↰↑	↱
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	5	70	22	53	168	72	19	137	31	70	313	33
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	78	24	59	187	80	21	152	34	78	348	37

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total (vph)	108	326	208	426	37
Volume Left (vph)	6	59	21	78	0
Volume Right (vph)	24	80	34	0	37
Hadj (s)	-0.09	-0.08	-0.05	0.13	-0.67
Departure Headway (s)	6.7	6.1	6.3	6.4	5.6
Degree Utilization, x	0.20	0.55	0.36	0.76	0.06
Capacity (veh/h)	453	550	516	546	616
Control Delay (s)	11.3	16.4	12.9	25.5	7.7
Approach Delay (s)	11.3	16.4	12.9	24.1	
Approach LOS	B	C	B	C	

Intersection Summary			
Delay	18.5		
HCM Level of Service	C		
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: Existing                                             11/06/06
========================================================================
INTERSECTION     6 Hillcrest/18th St                 Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------            46   68   26
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    13 ---  1.0   1.0  1.0  1.0   1.1 ---   28  RIGHT
                                                          STREET NAME:
THRU   118 ---> 2.1  (NO. OF LANES)   2.1<---  411  THRU  18th St

RIGHT   55 ---  1.1   1.0  1.1  1.1   1.0 ---  124  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 181   84  111                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Hillcrest
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     111        111       1650     0.0673
    THRU (T)       84         84       1650     0.0509
    LEFT (L)      181        181       1650     0.1097
    T + R                    195       1650     0.1182     0.1182
------------------------------------------------------------------------
SB  RIGHT (R)      46         33 *     1650     0.0200
    THRU (T)       68         68       1650     0.0412     0.0412
    LEFT (L)       26         26       1650     0.0158
------------------------------------------------------------------------
EB  RIGHT (R)      55         55       1650     0.0333
    THRU (T)      118        118       3300     0.0358
    LEFT (L)       13         13       1650     0.0079     0.0079
    T + R                    173       3300     0.0524
------------------------------------------------------------------------
WB  RIGHT (R)      28         28       1650     0.0170
    THRU (T)      411        411       3300     0.1245
    LEFT (L)      124        124       1650     0.0752
    T + R                    439       3300     0.1330     0.1330
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.30
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=EX.INT,VOL=EX.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: Existing                                             11/06/06
========================================================================
INTERSECTION     7 Viera/18th St                     Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            43   16    8
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    20 ---  1.0   1.1  1.1  1.1   1.1 ---  147  RIGHT
                                                          STREET NAME:
THRU   163 ---> 2.0  (NO. OF LANES)   1.1<---  377  THRU  18th St

RIGHT   31 ---  1.0   1.1  1.1  1.0   1.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 115   21    2                         Urb=N, Rur=N
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Viera
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)       2          2       1650     0.0012
    THRU (T)       21         21       1650     0.0127
    LEFT (L)      115        115       1650     0.0697     0.0697
    T + L                    136       1650     0.0824
------------------------------------------------------------------------
SB  RIGHT (R)      43         43       1650     0.0261
    THRU (T)       16         16       1650     0.0097
    LEFT (L)        8          8       1650     0.0048
    T + R                     59       1650     0.0358
    T + L                     24       1650     0.0145
    T + R + L                 67       1650     0.0406     0.0406
------------------------------------------------------------------------
EB  RIGHT (R)      31          0 *     1650     0.0000
    THRU (T)      163        163       3300     0.0494
    LEFT (L)       20         20       1650     0.0121     0.0121
------------------------------------------------------------------------
WB  RIGHT (R)     147        147       1650     0.0891
    THRU (T)      377        377       1650     0.2285
    LEFT (L)        0          0       1650     0.0000
    T + R                    524       1650     0.3176     0.3176
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.44
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=EX.INT,VOL=EX.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: Existing                                             11/06/06
========================================================================
INTERSECTION     9 SR 160 SB Ramp/Main Street        Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            16   11   25
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    10 ---  1.0   1.1  1.1  1.0   1.0 ---   57  RIGHT
                                                          STREET NAME:
THRU   170 ---> 2.1  (NO. OF LANES)   2.0<---  337  THRU  Main Street

RIGHT   17 ---  1.1   1.0  1.1  1.1   2.0 --- 1012  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   9    6   59                         Urb=N, Rur=N
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 SB Ramp
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      59         59       1650     0.0358
    THRU (T)        6          6       1650     0.0036
    LEFT (L)        9          9       1650     0.0055
    T + R                     65       1650     0.0394     0.0394
------------------------------------------------------------------------
SB  RIGHT (R)      16         16       1650     0.0097
    THRU (T)       11         11       1650     0.0067
    LEFT (L)       25         25       1650     0.0152     0.0152
    T + R                     27       1650     0.0164
------------------------------------------------------------------------
EB  RIGHT (R)      17         17       1650     0.0103
    THRU (T)      170        170       3300     0.0515
    LEFT (L)       10         10       1650     0.0061
    T + R                    187       3300     0.0567     0.0567
------------------------------------------------------------------------
WB  RIGHT (R)      57         32 *     1650     0.0194
    THRU (T)      337        337       3300     0.1021
    LEFT (L)     1012       1012       3000     0.3373     0.3373
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.45
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=EX.INT,VOL=EX.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: Existing                                             11/06/06
========================================================================
INTERSECTION    10 SR 160 NB Ramp/Main Street        Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0    0    0
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  RIGHT
                                                          STREET NAME:
THRU   229 ---> 2.1  (NO. OF LANES)   2.0<--- 1347  THRU  Main Street

RIGHT   25 ---  1.1   1.0  0.0  2.0   1.0 ---   48  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  59    0  743                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 NB Ramp
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     743        695 *     3127     0.2223     0.2223
    LEFT (L)       59         59       1720     0.0343
------------------------------------------------------------------------
EB  RIGHT (R)      25         25       1720     0.0145
    THRU (T)      229        229       3440     0.0666
    T + R                    254       3440     0.0738
------------------------------------------------------------------------
WB  THRU (T)     1347       1347       3440     0.3916     0.3916
    LEFT (L)       48         48       1720     0.0279
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.61
     INTERSECTION LEVEL OF SERVICE:                             B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=EX.INT,VOL=EX.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: Existing                                             11/06/06
========================================================================
INTERSECTION    11 Neroly/Main Street                Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------            64   60  160
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    59 ---  1.0   1.5  1.1  2.1   1.0 ---  348  RIGHT
                                                          STREET NAME:
THRU   688 ---> 2.1  (NO. OF LANES)   3.0<--- 1001  THRU  Main Street

RIGHT  208 ---  1.1   1.0  1.1  1.1   1.0 ---   17  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 347  146   33                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Neroly
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      33         33       1650     0.0200
    THRU (T)      146        146       1650     0.0885
    LEFT (L)      347        347       1650     0.2103     0.2103
    T + R                    179       1650     0.1085
------------------------------------------------------------------------
SB  RIGHT (R)      64          5 *     1650     0.0030
    THRU (T)       60         60       1650     0.0364
    LEFT (L)      160        160       3000     0.0533
    T + L                    220       3000     0.0733     0.0733
------------------------------------------------------------------------
EB  RIGHT (R)     208        208       1650     0.1261
    THRU (T)      688        688       3300     0.2085
    LEFT (L)       59         59       1650     0.0358
    T + R                    896       3300     0.2715     0.2715
------------------------------------------------------------------------
WB  RIGHT (R)     348        260 *     1650     0.1576
    THRU (T)     1001       1001       4950     0.2022
    LEFT (L)       17         17       1650     0.0103     0.0103
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.57
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=EX.INT,VOL=EX.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: Existing                                             11/06/06
========================================================================
INTERSECTION    14 Big Break/Main Street             Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------           182   36   51
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    74 ---  1.0   1.0  1.1  1.1   1.0 ---   51  RIGHT
                                                          STREET NAME:
THRU   753 ---> 2.0  (NO. OF LANES)   2.0<--- 1135  THRU  Main Street

RIGHT   31 ---  1.0   1.0  1.1  1.1   1.0 ---   48  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  57   18   26                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Big Break
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      26         26       1650     0.0158
    THRU (T)       18         18       1650     0.0109
    LEFT (L)       57         57       1650     0.0345     0.0345
    T + R                     44       1650     0.0267
------------------------------------------------------------------------
SB  RIGHT (R)     182        108 *     1650     0.0655     0.0655
    THRU (T)       36         36       1650     0.0218
    LEFT (L)       51         51       1650     0.0309
    T + L                     87       1650     0.0527
------------------------------------------------------------------------
EB  RIGHT (R)      31          0 *     1650     0.0000
    THRU (T)      753        753       3300     0.2282
    LEFT (L)       74         74       1650     0.0448     0.0448
------------------------------------------------------------------------
WB  RIGHT (R)      51          0 *     1650     0.0000
    THRU (T)     1135       1135       3300     0.3439     0.3439
    LEFT (L)       48         48       1650     0.0291
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.49
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=EX.INT,VOL=EX.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: Existing                                             11/06/06
========================================================================
INTERSECTION    17 Empire Ave/Oakley Road            Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------            52  250   41
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? Y
LEFT    45 ---  2.1   1.0  1.0  1.0   1.0 ---   15  RIGHT
                                                          STREET NAME:
THRU     7 ---> 1.1  (NO. OF LANES)   1.1<---    6  THRU  Oakley Road

RIGHT   90 ---  1.0   1.0  2.1  1.1   1.1 ---   12  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 165  369    4                         Urb=N, Rur=N
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire Ave
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)       4          4       1720     0.0023
    THRU (T)      369        369       3440     0.1073
    LEFT (L)      165        165       1720     0.0959     0.0959
    T + R                    373       3440     0.1084
------------------------------------------------------------------------
SB  RIGHT (R)      52         27 *     1720     0.0157
    THRU (T)      250        250       1720     0.1453     0.1453
    LEFT (L)       41         41       1720     0.0238
------------------------------------------------------------------------
EB  RIGHT (R)      90          0 *     1720     0.0000
    THRU (T)        7          7       1720     0.0041
    LEFT (L)       45         45       3127     0.0144
    T + L                     52       3127     0.0166     0.0166
------------------------------------------------------------------------
WB  RIGHT (R)      15          0 *     1720     0.0000
    THRU (T)        6          6       1720     0.0035
    LEFT (L)       12         12       1720     0.0070
    T + L                     18       1720     0.0105     0.0105
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.27
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=EX.INT,VOL=EX.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: Existing                                             11/06/06
========================================================================
INTERSECTION    18 Empire Avenue/Main Street         Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       2-PHASE SIGNAL
-----------            30   49   10
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    10 ---  1.0   1.0  1.1  1.1   1.1 ---    3  RIGHT
                                                          STREET NAME:
THRU   666 ---> 2.0  (NO. OF LANES)   2.1<---  775  THRU  Main Street

RIGHT  175 ---  1.0   2.0  1.0  1.0   1.0 ---  119  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 323    4  102                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     102          0 *     1800     0.0000
    THRU (T)        4          4       1800     0.0022
    LEFT (L)      323        323       3273     0.0987     0.0987
------------------------------------------------------------------------
SB  RIGHT (R)      30         20 *     1800     0.0111
    THRU (T)       49         49       1800     0.0272
    LEFT (L)       10         10       1800     0.0056
    T + L                     59       1800     0.0328     0.0328
------------------------------------------------------------------------
EB  RIGHT (R)     175          0 *     1800     0.0000
    THRU (T)      666        666       3600     0.1850     0.1850
    LEFT (L)       10         10       1800     0.0056
------------------------------------------------------------------------
WB  RIGHT (R)       3          3       1800     0.0017
    THRU (T)      775        775       3600     0.2153
    LEFT (L)      119        119       1800     0.0661     0.0661
    T + R                    778       3600     0.2161
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.38
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=EX.INT,VOL=EX.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: Existing                                             11/06/06
========================================================================
INTERSECTION    19 Vintage/Main Street               Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------           117    0  200
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    68 ---  1.0   1.0  0.0  1.0   1.1 ---   91  RIGHT
                                                          STREET NAME:
THRU   759 ---> 2.0  (NO. OF LANES)   2.1<---  728  THRU  Main Street

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Vintage
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)     117         49 *     1720     0.0285
    LEFT (L)      200        200       1720     0.1163     0.1163
------------------------------------------------------------------------
EB  THRU (T)      759        759       3440     0.2206
    LEFT (L)       68         68       1720     0.0395     0.0395
------------------------------------------------------------------------
WB  RIGHT (R)      91         91       1720     0.0529
    THRU (T)      728        728       3440     0.2116
    T + R                    819       3440     0.2381     0.2381
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.39
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=EX.INT,VOL=EX.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: Existing                                             11/06/06
========================================================================
INTERSECTION    20 O'Hara Avenue/Main Street         Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             3    0    2
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     1 ---  1.0   1.1  1.1  1.1   1.1 ---    1  RIGHT
                                                          STREET NAME:
THRU   912 ---> 1.0  (NO. OF LANES)   1.1<---  764  THRU  Main Street

RIGHT   46 ---  1.0   1.0  1.1  1.1   1.0 ---   17  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  52    0   20                         Urb=N, Rur=N
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: O'Hara Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      20         20       1720     0.0116
    THRU (T)        0          0       1720     0.0000
    LEFT (L)       52         52       1720     0.0302     0.0302
    T + R                     20       1720     0.0116
------------------------------------------------------------------------
SB  RIGHT (R)       3          3       1720     0.0017
    THRU (T)        0          0       1720     0.0000
    LEFT (L)        2          2       1720     0.0012
    T + R                      3       1720     0.0017
    T + L                      2       1720     0.0012
    T + R + L                  5       1720     0.0029     0.0029
------------------------------------------------------------------------
EB  RIGHT (R)      46          0 *     1720     0.0000
    THRU (T)      912        912       1720     0.5302     0.5302
    LEFT (L)        1          1       1720     0.0006
------------------------------------------------------------------------
WB  RIGHT (R)       1          1       1720     0.0006
    THRU (T)      764        764       1720     0.4442
    LEFT (L)       17         17       1720     0.0099     0.0099
    T + R                    765       1720     0.4448
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.57
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=EX.INT,VOL=EX.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: Existing                                             11/06/06
========================================================================
INTERSECTION    21 Empire Avenue/Cypress Road        Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0  292   74
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  2.0  1.0   1.0 ---  217  RIGHT
                                                          STREET NAME:
THRU     0 ---> 0.0  (NO. OF LANES)   0.0<---    0  THRU  Cypress Road

RIGHT    0 ---  0.0   0.0  2.1  1.1   1.0 ---   83  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0  306   49                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      49         49       1720     0.0285
    THRU (T)      306        306       3440     0.0890
    T + R                    355       3440     0.1032     0.1032
------------------------------------------------------------------------
SB  THRU (T)      292        292       3440     0.0849
    LEFT (L)       74         74       1720     0.0430     0.0430
------------------------------------------------------------------------
WB  RIGHT (R)     217        143 *     1720     0.0831     0.0831
    LEFT (L)       83         83       1720     0.0483
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.23
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=EX.INT,VOL=EX.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: Existing                                             11/06/06
========================================================================
INTERSECTION    22 Main Street/Cypress               Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------             4  488  327
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    37 ---  1.0   1.0  2.0  1.0   1.0 ---  278  RIGHT
                                                          STREET NAME:
THRU    92 ---> 1.0  (NO. OF LANES)   1.0<---   59  THRU  Cypress

RIGHT   60 ---  1.0   1.0  2.0  1.0   1.0 ---   97  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  27  401   95                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Main Street
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      95          0 *     1650     0.0000
    THRU (T)      401        401       3300     0.1215     0.1215
    LEFT (L)       27         27       1650     0.0164
------------------------------------------------------------------------
SB  RIGHT (R)       4          0 *     1650     0.0000
    THRU (T)      488        488       3300     0.1479
    LEFT (L)      327        327       1650     0.1982     0.1982
------------------------------------------------------------------------
EB  RIGHT (R)      60         33 *     1650     0.0200
    THRU (T)       92         92       1650     0.0558     0.0558
    LEFT (L)       37         37       1650     0.0224
------------------------------------------------------------------------
WB  RIGHT (R)     278          0 *     1650     0.0000
    THRU (T)       59         59       1650     0.0358
    LEFT (L)       97         97       1650     0.0588     0.0588
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.43
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=EX.INT,VOL=EX.AM,CAP=
```

Existing PM

HCM Unsignalized Intersection Capacity Analysis
1: Wilbur Avenue & Minaker Drive

Existing PM
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↰↑↱			↰↑	↱
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	14	364	151	24	162	6	55	0	30	13	3	15
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	16	404	168	27	180	7	61	0	33	14	3	17
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	187			572			681	759	286	503	840	93
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	187			572			681	759	286	503	840	93
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			97			81	100	95	97	99	98
cM capacity (veh/h)	1385			997			318	322	711	418	289	945

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	16	270	303	27	120	67	94	18	17
Volume Left	16	0	0	27	0	0	61	14	0
Volume Right	0	0	168	0	0	7	33	0	17
cSH	1385	1700	1700	997	1700	1700	395	385	945
Volume to Capacity	0.01	0.16	0.18	0.03	0.07	0.04	0.24	0.05	0.02
Queue Length 95th (ft)	1	0	0	2	0	0	23	4	1
Control Delay (s)	7.6	0.0	0.0	8.7	0.0	0.0	16.9	14.8	8.9
Lane LOS	A			A			C	B	A
Approach Delay (s)	0.2			1.1			16.9	11.9	
Approach LOS							C	B	

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	38.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
2: Wilbur Avenue & Viera Avenue

Existing PM
11/6/2006

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱		↰	↑	↰↱	
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	367	90	8	142	24	11
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	382	94	8	148	25	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			476		594	429
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			476		594	429
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		95	98
cM capacity (veh/h)			1086		464	626

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	476	8	148	36
Volume Left	0	8	0	25
Volume Right	94	0	0	11
cSH	1700	1086	1700	505
Volume to Capacity	0.28	0.01	0.09	0.07
Queue Length 95th (ft)	0	1	0	6
Control Delay (s)	0.0	8.3	0.0	12.7
Lane LOS		A		B
Approach Delay (s)	0.0	0.4		12.7
Approach LOS				B

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	34.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
3: Wilbur Avenue & SR 160 SB Off

Existing PM
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱		↰	↑↑					↰		↱
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	456	85	32	146	0	0	0	0	118	0	58
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	507	94	36	162	0	0	0	0	131	0	64
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	162			601			706	787	554	787	834	81
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	162			601			706	787	554	787	834	81
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			96			100	100	100	52	100	93
cM capacity (veh/h)	1414			972			293	310	476	274	291	962

Direction, Lane #	EB 1	WB 1	WB 2	WB 3	SB 1	SB 2
Volume Total	601	36	81	81	131	64
Volume Left	0	36	0	0	131	0
Volume Right	94	0	0	0	0	64
cSH	1700	972	1700	1700	274	962
Volume to Capacity	0.35	0.04	0.05	0.05	0.48	0.07
Queue Length 95th (ft)	0	3	0	0	61	5
Control Delay (s)	0.0	8.8	0.0	0.0	29.6	9.0
Lane LOS		A			D	A
Approach Delay (s)	0.0	1.6			22.8	
Approach LOS					C	

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
4: Wilbur Avenue & SR 160 NB On

Existing PM
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑			↑↱		↰		↱			
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	107	467	0	0	147	104	18	0	20	0	0	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	119	519	0	0	163	116	20	0	22	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	279			519			838	1036	259	718	978	139
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	279			519			838	1036	259	718	978	139
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	91			100			92	100	97	100	100	100
cM capacity (veh/h)	1281			1043			240	209	739	285	226	883

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2
Volume Total	119	259	259	109	170	20	22
Volume Left	119	0	0	0	0	20	0
Volume Right	0	0	0	0	116	0	22
cSH	1281	1700	1700	1700	1700	240	739
Volume to Capacity	0.09	0.15	0.15	0.06	0.10	0.08	0.03
Queue Length 95th (ft)	8	0	0	0	0	7	2
Control Delay (s)	8.1	0.0	0.0	0.0	0.0	21.3	10.0
Lane LOS	A					C	B
Approach Delay (s)	1.5			0.0		15.4	
Approach LOS						C	

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
5: Wilbur Avenue & Bridgehead Road

Existing PM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	34	0	453	0	0	0	210	36	0	0	31	41
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	36	0	477	0	0	0	221	38	0	0	33	43

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1
Volume Total (vph)	36	477	0	259	76
Volume Left (vph)	36	0	0	221	0
Volume Right (vph)	0	477	0	0	43
Hadj (s)	0.53	-0.67	0.00	0.20	-0.31
Departure Headway (s)	6.0	4.8	5.7	5.5	5.3
Degree Utilization, x	0.06	0.63	0.00	0.39	0.11
Capacity (veh/h)	578	734	580	610	613
Control Delay (s)	8.2	14.4	8.7	12.0	8.9
Approach Delay (s)	14.0		0.0	12.0	8.9
Approach LOS	B		A	B	A

Intersection Summary			
Delay	12.9		
HCM Level of Service	B		
Intersection Capacity Utilization	54.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
6: Big Break Road & Hillcrest Avenue

Existing PM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↱		↰	↑	↱	↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.94		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3342		1770	3502		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3342		1770	3502		1770	1863	1583	1770	1863	1583
Volume (vph)	39	394	233	212	292	22	158	151	237	50	117	27
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	41	410	243	221	304	23	165	157	247	52	122	28
RTOR Reduction (vph)	0	54	0	0	3	0	0	0	135	0	0	24
Lane Group Flow (vph)	41	599	0	221	324	0	165	157	112	52	122	4
Turn Type	Prot			Prot			Split		Perm	Split		Perm
Protected Phases	1	6		5	2		8	8		4	4	
Permitted Phases									8			4
Actuated Green, G (s)	4.2	28.3		11.8	36.9		10.4	10.4	10.4	8.3	8.3	8.3
Effective Green, g (s)	5.2	30.3		13.3	38.4		11.9	11.9	11.9	9.8	9.8	9.8
Actuated g/C Ratio	0.07	0.39		0.17	0.50		0.15	0.15	0.15	0.13	0.13	0.13
Clearance Time (s)	4.0	5.0		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	119	1310		305	1740		272	287	244	224	236	201
v/s Ratio Prot	0.02	c0.18		c0.12	0.09		c0.09	0.08		0.03	c0.07	
v/s Ratio Perm									0.07			0.00
v/c Ratio	0.34	0.46		0.72	0.19		0.61	0.55	0.46	0.23	0.52	0.02
Uniform Delay, d1	34.4	17.4		30.3	10.8		30.5	30.2	29.8	30.4	31.5	29.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.7	0.3		8.3	0.1		3.8	2.1	1.4	0.5	1.9	0.0
Delay (s)	36.2	17.7		38.5	10.8		34.3	32.3	31.1	30.9	33.4	29.6
Level of Service	D	B		D	B		C	C	C	C	C	C
Approach Delay (s)		18.8			22.0			32.4			32.3	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM Average Control Delay	24.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	77.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
7: Big Break Road & Viera Avenue

Existing PM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↱			↰↑	↱		✥	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	0.99			1.00	0.85		0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00		0.99	
Satd. Flow (prot)	1770	3539	1583	1770	1844			1787	1583		1762	
Flt Permitted	0.53	1.00	1.00	0.47	1.00			0.75	1.00		0.89	
Satd. Flow (perm)	981	3539	1583	884	1844			1402	1583		1591	
Volume (vph)	32	463	108	3	322	23	82	14	4	30	42	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	34	487	114	3	339	24	86	15	4	32	44	32
RTOR Reduction (vph)	0	0	38	0	2	0	0	0	3	0	20	0
Lane Group Flow (vph)	34	487	76	3	361	0	0	101	1	0	88	0
Turn Type	Perm		Perm	Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	30.6	30.6	30.6	30.6	30.6			8.2	8.2		8.2	
Effective Green, g (s)	32.6	32.6	32.6	32.6	32.6			10.2	10.2		10.2	
Actuated g/C Ratio	0.67	0.67	0.67	0.67	0.67			0.21	0.21		0.21	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	655	2364	1057	591	1232			293	331		333	
v/s Ratio Prot		0.14			c0.20							
v/s Ratio Perm	0.03		0.05	0.00				c0.07	0.00		0.06	
v/c Ratio	0.05	0.21	0.07	0.01	0.29			0.34	0.00		0.26	
Uniform Delay, d1	2.8	3.1	2.8	2.7	3.3			16.5	15.3		16.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.0	0.0	0.0	0.0	0.1			0.7	0.0		0.4	
Delay (s)	2.8	3.2	2.9	2.7	3.5			17.2	15.3		16.6	
Level of Service	A	A	A	A	A			B	B		B	
Approach Delay (s)		3.1			3.5			17.1			16.6	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	5.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	48.8	Sum of lost time (s)	6.0
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
8: Big Break Road & Phillips Lane

Existing PM
11/6/2006

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↱			↰↑	↰↱	
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	366	6	5	319	0	17
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	373	6	5	326	0	17
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			380		712	377
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			380		712	377
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	97
cM capacity (veh/h)			1179		397	670

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	380	331	17
Volume Left	0	5	0
Volume Right	6	0	17
cSH	1700	1179	670
Volume to Capacity	0.22	0.00	0.03
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.0	0.2	10.5
Lane LOS		A	B
Approach Delay (s)	0.0	0.2	10.5
Approach LOS			B

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	30.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
9: Big Break Road & SR 160 SB Off

Existing PM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑⤴		↰↰	↑↑	↱	↰	⤴		↰	⤴	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.87		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3367		3335	3438	1538	1719	1572		1719	1721	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.73	1.00		0.67	1.00	
Satd. Flow (perm)	1719	3367		3335	3438	1538	1316	1572		1213	1721	
Volume (vph)	13	334	54	849	282	96	10	16	114	74	30	14
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	14	348	56	884	294	100	10	17	119	77	31	15
RTOR Reduction (vph)	0	11	0	0	0	36	0	105	0	0	13	0
Lane Group Flow (vph)	14	393	0	884	294	64	10	31	0	77	33	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases						6	8			4		
Actuated Green, G (s)	1.0	15.8		19.5	33.8	33.8	6.8	6.8		6.8	6.8	
Effective Green, g (s)	1.0	15.8		19.0	33.8	33.8	6.3	6.3		6.3	6.3	
Actuated g/C Ratio	0.02	0.30		0.36	0.64	0.64	0.12	0.12		0.12	0.12	
Clearance Time (s)	4.0	4.0		3.5	4.0	4.0	3.5	3.5		3.5	3.5	
Vehicle Extension (s)	3.0	3.0		3.0	4.0	4.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	32	1002		1193	2188	979	156	187		144	204	
v/s Ratio Prot	0.01	c0.12		c0.27	0.09			0.02			0.02	
v/s Ratio Perm						0.04	0.01			c0.06		
v/c Ratio	0.44	0.39		0.74	0.13	0.07	0.06	0.17		0.53	0.16	
Uniform Delay, d1	25.8	14.8		14.9	3.8	3.7	20.8	21.0		22.0	21.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.3	0.3		2.5	0.0	0.0	0.1	0.2		1.9	0.1	
Delay (s)	35.1	15.1		17.4	3.9	3.7	20.8	21.2		23.9	21.2	
Level of Service	D	B		B	A	A	C	C		C	C	
Approach Delay (s)		15.8			13.2			21.2			22.9	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM Average Control Delay	15.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	53.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Big Break Road & SR 160 NB On

Existing PM
11/6/2006

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑⤴		↰	↑↑	↰	↱↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	1.00	0.88
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3408		1719	3438	1719	2707
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3408		1719	3438	1719	2707
Volume (vph)	491	31	48	1164	63	1585
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	511	32	50	1212	66	1651
RTOR Reduction (vph)	4	0	0	0	0	279
Lane Group Flow (vph)	539	0	50	1212	66	1372
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Turn Type			Prot			pm+ov
Protected Phases	2		1	6	8	1
Permitted Phases						8
Actuated Green, G (s)	61.7		48.5	113.2	8.3	56.8
Effective Green, g (s)	62.2		47.5	113.7	8.3	55.8
Actuated g/C Ratio	0.48		0.37	0.87	0.06	0.43
Clearance Time (s)	4.5		3.0	4.5	4.0	3.0
Vehicle Extension (s)	4.0		3.0	4.0	2.0	3.0
Lane Grp Cap (vph)	1631		628	3007	110	1245
v/s Ratio Prot	0.16		0.03	c0.35	0.04	c0.40
v/s Ratio Perm						0.10
v/c Ratio	0.33		0.08	0.40	0.60	1.10
Uniform Delay, d1	21.0		27.0	1.6	59.2	37.1
Progression Factor	1.00		0.74	3.59	1.00	1.00
Incremental Delay, d2	0.5		0.0	0.3	5.8	58.4
Delay (s)	21.5		20.1	6.0	65.0	95.5
Level of Service	C		C	A	E	F
Approach Delay (s)	21.5			6.6	94.3	
Approach LOS	C			A	F	

Intersection Summary			
HCM Average Control Delay	51.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	76.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Big Break Road & Bridgehead Road

Existing PM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑⤴		↰	↑↑↑	↱	↰	⤴		↰	⤶	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.91	1.00	1.00	1.00		0.95	0.95	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (prot)	1719	3313		1719	4940	1538	1719	1725		1633	1680	1538
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (perm)	1719	3313		1719	4940	1538	1719	1725		1633	1680	1538
Volume (vph)	58	1506	484	18	904	161	279	84	38	339	127	57
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	59	1537	494	18	922	164	285	86	39	346	130	58
RTOR Reduction (vph)	0	21	0	0	0	80	0	13	0	0	0	49
Lane Group Flow (vph)	59	2010	0	18	922	84	285	112	0	232	244	9
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot		Perm	Split			Split		Perm
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases						6						7
Actuated Green, G (s)	8.6	69.8		4.0	65.2	65.2	20.0	20.0		21.2	21.2	21.2
Effective Green, g (s)	7.6	70.8		3.0	66.2	66.2	19.5	19.5		20.7	20.7	20.7
Actuated g/C Ratio	0.06	0.54		0.02	0.51	0.51	0.15	0.15		0.16	0.16	0.16
Clearance Time (s)	3.0	5.0		3.0	5.0	5.0	3.5	3.5		3.5	3.5	3.5
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	100	1804		40	2516	783	258	259		260	268	245
v/s Ratio Prot	0.03	c0.61		0.01	c0.19		c0.17	0.07		0.14	c0.15	
v/s Ratio Perm						0.05						0.01
v/c Ratio	0.59	1.11		0.45	0.37	0.11	1.10	0.43		0.89	0.91	0.04
Uniform Delay, d1	59.7	29.6		62.7	19.2	16.6	55.2	50.2		53.6	53.7	46.2
Progression Factor	1.01	1.01		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.2	54.8		2.9	0.4	0.3	87.0	0.4		28.8	31.9	0.0
Delay (s)	62.4	84.8		65.6	19.7	16.8	142.2	50.7		82.4	85.7	46.2
Level of Service	E	F		E	B	B	F	D		F	F	D
Approach Delay (s)		84.2			20.0			114.3			80.0	
Approach LOS		F			B			F			E	

Intersection Summary			
HCM Average Control Delay	69.5	HCM Level of Service	E
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	95.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
12: Big Break Road & Sandy Lane

Existing PM
11/6/2006

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑⤴		↰	↑↑	Y	
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	1856	0	0	1079	0	1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	1933	0	0	1124	0	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL		
Median storage veh)					0	
Upstream signal (ft)	1017					
pX, platoon unblocked			0.50		0.50	0.50
vC, conflicting volume			1933		2495	967
vC1, stage 1 conf vol					1933	
vC2, stage 2 conf vol					562	
vCu, unblocked vol			1867		2991	0
tC, single (s)			4.2		6.9	7.0
tC, 2 stage (s)					5.9	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			153		33	537

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	1289	644	0	562	562	1
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	1
cSH	1700	1700	1700	1700	1700	537
Volume to Capacity	0.76	0.38	0.00	0.33	0.33	0.00
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	11.7
Lane LOS						B
Approach Delay (s)	0.0		0.0			11.7
Approach LOS						B

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
13: Big Break Road & Live Oak Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↱		↰	↑↑		↰		↱			
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	1775	70	13	1056	0	20	0	28	0	0	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	1830	72	13	1089	0	21	0	29	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									5			
Median type								TWLTL			None	
Median storage veh)								0				
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1089			1902			2437	2981	951	2030	3018	544
vC1, stage 1 conf vol							1866	1866				
vC2, stage 2 conf vol							571	1115				
vCu, unblocked vol	1089			1902			2437	2981	951	2030	3018	544
tC, single (s)	4.1			4.2			7.6	6.5	7.0	7.5	6.5	6.9
tC, 2 stage (s)							6.6	5.5				
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			95			0	100	89	100	100	100
cM capacity (veh/h)	637			297			15	60	255	29	12	483

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	1220	682	13	544	544	49
Volume Left	0	0	13	0	0	21
Volume Right	0	72	0	0	0	29
cSH	1700	1700	297	1700	1700	36
Volume to Capacity	0.72	0.40	0.05	0.32	0.32	1.37
Queue Length 95th (ft)	0	0	4	0	0	130
Control Delay (s)	0.0	0.0	17.7	0.0	0.0	311.6
Lane LOS			C			F
Approach Delay (s)	0.0		0.2			311.6
Approach LOS						F

Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
14: Big Break Road & Main Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↱			↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.98	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1639			1767	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.71	1.00			0.43	1.00
Satd. Flow (perm)	1719	3438	1538	1719	3438	1538	1282	1639			775	1538
Volume (vph)	250	1337	164	64	863	58	68	52	88	34	37	101
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	263	1407	173	67	908	61	72	55	93	36	39	106
RTOR Reduction (vph)	0	0	38	0	0	26	0	74	0	0	0	96
Lane Group Flow (vph)	263	1407	135	67	908	35	72	74	0	0	75	10
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot		Perm	Prot		Perm	Perm			Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8			4		4
Actuated Green, G (s)	22.0	71.7	71.7	7.2	56.9	56.9	9.6	9.6			9.6	9.6
Effective Green, g (s)	21.0	72.7	72.7	6.2	57.9	57.9	9.1	9.1			9.1	9.1
Actuated g/C Ratio	0.21	0.73	0.73	0.06	0.58	0.58	0.09	0.09			0.09	0.09
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.5	3.5			3.5	3.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)	361	2499	1118	107	1991	891	117	149			71	140
v/s Ratio Prot	c0.15	c0.41		0.04	0.26			0.05				
v/s Ratio Perm			0.09			0.02	0.06				c0.10	0.01
v/c Ratio	0.73	0.56	0.12	0.63	0.46	0.04	0.62	0.50			1.06	0.07
Uniform Delay, d1	36.8	6.3	4.1	45.8	12.0	9.1	43.8	43.3			45.5	41.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	6.1	0.9	0.2	8.0	0.8	0.1	6.6	1.0			123.2	0.1
Delay (s)	43.0	7.2	4.3	53.7	12.8	9.2	50.4	44.2			168.6	41.7
Level of Service	D	A	A	D	B	A	D	D			F	D
Approach Delay (s)		12.1			15.2			46.2			94.3	
Approach LOS		B			B			D			F	

Intersection Summary			
HCM Average Control Delay	19.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
15: Oakley Road & Neroly Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	6	79	83	7	44	96	52	240	8	167	437	10
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	6	81	85	7	45	98	53	245	8	170	446	10

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	171	150	306	627
Volume Left (vph)	6	7	53	170
Volume Right (vph)	85	98	8	10
Hadj (s)	-0.26	-0.35	0.05	0.08
Departure Headway (s)	6.8	6.8	6.2	5.7
Degree Utilization, x	0.32	0.28	0.53	0.99
Capacity (veh/h)	507	502	557	622
Control Delay (s)	13.0	12.4	16.0	57.6
Approach Delay (s)	13.0	12.4	16.0	57.6
Approach LOS	B	B	C	F

Intersection Summary			
Delay	35.9		
HCM Level of Service	E		
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
16: Oakley Road & Live Oak Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	8	162	34	30	112	12	37	32	24	76	91	5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	9	180	38	33	124	13	41	36	27	84	101	6

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	227	171	103	191
Volume Left (vph)	9	33	41	84
Volume Right (vph)	38	13	27	6
Hadj (s)	-0.06	0.03	-0.04	0.10
Departure Headway (s)	4.9	5.0	5.2	5.2
Degree Utilization, x	0.31	0.24	0.15	0.27
Capacity (veh/h)	690	663	631	642
Control Delay (s)	10.0	9.6	9.1	10.1
Approach Delay (s)	10.0	9.6	9.1	10.1
Approach LOS	B	A	A	B

Intersection Summary			
Delay	9.8		
HCM Level of Service	A		
Intersection Capacity Utilization	39.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
17: Oakley Road & Empire Avenue

Existing PM
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↑	↱		↰↑	↱	↰	↑↑↱		↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95		1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1745	1583		1809	1583	1770	3527		1770	1863	1583
Flt Permitted	0.95	0.99	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1745	1583		1809	1583	1770	3527		1770	1863	1583
Volume (vph)	53	31	255	48	33	61	134	428	10	132	500	66
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	58	34	277	52	36	66	146	465	11	143	543	72
RTOR Reduction (vph)	0	0	247	0	0	59	0	2	0	0	0	40
Lane Group Flow (vph)	45	47	30	0	88	7	146	474	0	143	543	32
Turn Type	Split		Perm	Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8						6
Actuated Green, G (s)	8.1	8.1	8.1		7.4	7.4	8.2	31.0		8.7	31.5	31.5
Effective Green, g (s)	8.1	8.1	8.1		8.4	8.4	9.2	32.0		9.7	32.5	32.5
Actuated g/C Ratio	0.11	0.11	0.11		0.11	0.11	0.12	0.43		0.13	0.44	0.44
Clearance Time (s)	4.0	4.0	4.0		5.0	5.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	184	190	173		205	179	219	1521		231	816	693
v/s Ratio Prot	0.03	c0.03			c0.05		c0.08	0.13		0.08	c0.29	
v/s Ratio Perm			0.02			0.00						0.02
v/c Ratio	0.24	0.25	0.17		0.43	0.04	0.67	0.31		0.62	0.67	0.05
Uniform Delay, d1	30.2	30.3	30.0		30.7	29.3	31.0	13.9		30.5	16.5	12.0
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.7	0.7	0.5		1.4	0.1	7.5	0.1		4.9	2.1	0.0
Delay (s)	30.9	30.9	30.5		32.1	29.4	38.5	14.0		35.4	18.6	12.0
Level of Service	C	C	C		C	C	D	B		D	B	B
Approach Delay (s)		30.6			31.0			19.7			21.1	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM Average Control Delay	23.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	74.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
18: Main Street & Empire Avenue

Existing PM
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑↱		↰↰	↑	↱		↰↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.98	1.00
Satd. Flow (prot)	1719	3539	1538	1770	3532		3335	1810	1583		1791	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.98	1.00
Satd. Flow (perm)	1719	3539	1538	1770	3532		3335	1810	1583		1791	1538
Volume (vph)	45	1046	511	173	689	9	366	28	148	14	14	12
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	48	1113	544	184	733	10	389	30	157	15	15	13
RTOR Reduction (vph)	0	0	312	0	1	0	0	0	125	0	0	13
Lane Group Flow (vph)	48	1113	232	184	742	0	389	30	32	0	30	0
Heavy Vehicles (%)	5%	2%	5%	2%	2%	2%	5%	5%	2%	2%	5%	5%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	2.8	33.1	33.1	10.1	40.4		15.3	15.3	15.3		2.3	2.3
Effective Green, g (s)	3.8	34.1	34.1	11.1	41.4		16.3	16.3	16.3		2.3	2.3
Actuated g/C Ratio	0.05	0.43	0.43	0.14	0.52		0.20	0.20	0.20		0.03	0.03
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	82	1512	657	246	1832		681	370	323		52	44
v/s Ratio Prot	0.03	c0.31		c0.10	0.21		c0.12	0.02			c0.02	
v/s Ratio Perm			0.15						0.02			0.00
v/c Ratio	0.59	0.74	0.35	0.75	0.41		0.57	0.08	0.10		0.58	0.01
Uniform Delay, d1	37.2	19.1	15.4	33.0	11.7		28.6	25.7	25.8		38.3	37.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	10.2	1.9	0.3	11.7	0.1		1.2	0.1	0.1		14.6	0.1
Delay (s)	47.5	21.0	15.7	44.7	11.8		29.8	25.8	25.9		52.8	37.7
Level of Service	D	C	B	D	B		C	C	C		D	D
Approach Delay (s)		20.1			18.4			28.5			48.3	
Approach LOS		C			B			C			D	

Intersection Summary			
HCM Average Control Delay	21.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	79.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	65.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
19: Main Street & Vintage Parkway

Existing PM
11/6/2006

	↗	→	←	↖	↘	↙
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑	↑↑↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3450		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3539	3450		1770	1583
Volume (vph)	169	1103	787	159	167	108
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	180	1173	837	169	178	115
RTOR Reduction (vph)	0	0	15	0	0	97
Lane Group Flow (vph)	180	1173	991	0	178	18
Turn Type	Prot					Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	9.7	44.5	30.8		9.8	9.8
Effective Green, g (s)	9.7	45.5	31.8		9.8	9.8
Actuated g/C Ratio	0.15	0.72	0.50		0.15	0.15
Clearance Time (s)	4.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	271	2544	1733		274	245
v/s Ratio Prot	c0.10	0.33	c0.29		c0.10	
v/s Ratio Perm						0.01
v/c Ratio	0.66	0.46	0.57		0.65	0.07
Uniform Delay, d1	25.3	3.7	11.0		25.1	22.9
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	6.0	0.1	0.5		5.2	0.1
Delay (s)	31.3	3.9	11.5		30.4	23.0
Level of Service	C	A	B		C	C
Approach Delay (s)		7.5	11.5		27.5	
Approach LOS		A	B		C	

Intersection Summary			
HCM Average Control Delay	11.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	63.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
20: Main Street & O'Hara Avenue

Existing PM
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑↱			↰↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85			0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1770	1863	1583	1770	1862		1770	1583			1695	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.76	1.00			0.91	
Satd. Flow (perm)	1770	1863	1583	1770	1862		1409	1583			1580	
Volume (vph)	3	1108	157	12	890	2	56	0	40	1	0	1
Peak-hour factor, PHF	0.92	0.94	0.94	0.94	0.94	0.92	0.94	0.92	0.94	0.92	0.92	0.92
Adj. Flow (vph)	3	1179	167	13	947	2	60	0	43	1	0	1
RTOR Reduction (vph)	0	0	33	0	0	0	0	39	0	0	1	0
Lane Group Flow (vph)	3	1179	134	13	949	0	60	4	0	0	1	0
Turn Type	Prot		Perm	Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4				2			6		
Actuated Green, G (s)	0.9	81.7	81.7	0.9	81.7		8.7	8.7			9.7	
Effective Green, g (s)	0.9	82.7	82.7	0.9	82.7		9.7	9.7			9.7	
Actuated g/C Ratio	0.01	0.79	0.79	0.01	0.79		0.09	0.09			0.09	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	15	1463	1243	15	1462		130	146			146	
v/s Ratio Prot	0.00	c0.63		c0.01	0.51			0.00				
v/s Ratio Perm			0.08				c0.04				0.00	
v/c Ratio	0.20	0.81	0.11	0.87	0.65		0.46	0.03			0.01	
Uniform Delay, d1	51.8	6.6	2.6	52.1	4.9		45.3	43.5			43.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	6.5	3.3	0.0	162.9	1.0		2.6	0.1			0.0	
Delay (s)	58.3	10.0	2.7	215.1	6.0		47.9	43.6			43.4	
Level of Service	E	A	A	F	A		D	D			D	
Approach Delay (s)		9.2			8.8			46.1			43.4	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM Average Control Delay	10.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	105.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
21: Cypress Road & Empire Avenue

Existing PM
11/6/2006

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↱		↰	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3485		1770	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	3485		1770	3539
Volume (vph)	23	219	411	47	220	527
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	24	233	437	50	234	561
RTOR Reduction (vph)	0	195	14	0	0	0
Lane Group Flow (vph)	24	38	473	0	234	561
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	5.8	5.8	13.5		8.1	25.6
Effective Green, g (s)	6.8	6.8	14.5		8.1	26.6
Actuated g/C Ratio	0.16	0.16	0.35		0.20	0.64
Clearance Time (s)	5.0	5.0	5.0		4.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	291	260	1221		346	2274
v/s Ratio Prot	0.01		c0.14		c0.13	0.16
v/s Ratio Perm		c0.02				
v/c Ratio	0.08	0.15	0.39		0.68	0.25
Uniform Delay, d1	14.7	14.8	10.1		15.4	3.1
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.1	0.3	0.2		5.2	0.1
Delay (s)	14.8	15.1	10.3		20.6	3.2
Level of Service	B	B	B		C	A
Approach Delay (s)	15.1		10.3			8.3
Approach LOS	B		B			A

Intersection Summary			
HCM Average Control Delay	10.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	41.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	38.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
22: Cypress Road & Main Street

Existing PM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑↑	↱	↰	↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.60	1.00	1.00	0.70	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1111	1863	1583	1303	1863	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	29	80	46	53	114	288	53	438	86	379	597	37
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	32	89	51	59	127	320	59	487	96	421	663	41
RTOR Reduction (vph)	0	0	43	0	0	273	0	0	55	0	0	14
Lane Group Flow (vph)	32	89	8	59	127	47	59	487	41	421	663	27
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	12.4	12.4	12.4	12.4	12.4	12.4	4.7	35.9	35.9	23.9	55.1	55.1
Effective Green, g (s)	12.4	12.4	12.4	12.4	12.4	12.4	4.7	35.9	35.9	23.9	55.1	55.1
Actuated g/C Ratio	0.15	0.15	0.15	0.15	0.15	0.15	0.06	0.43	0.43	0.28	0.65	0.65
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	164	274	233	192	274	233	99	1509	675	502	2316	1036
v/s Ratio Prot		0.05			c0.07		0.03	c0.14		c0.24	0.19	
v/s Ratio Perm	0.03		0.00	0.05		0.03			0.03			0.02
v/c Ratio	0.20	0.32	0.03	0.31	0.46	0.20	0.60	0.32	0.06	0.84	0.29	0.03
Uniform Delay, d1	31.5	32.2	30.8	32.1	32.9	31.6	38.8	16.1	14.2	28.3	6.2	5.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.7	0.1	0.9	1.2	0.4	9.3	0.6	0.2	11.7	0.3	0.0
Delay (s)	32.1	32.8	30.8	33.0	34.1	32.0	48.1	16.6	14.4	40.0	6.5	5.2
Level of Service	C	C	C	C	C	C	D	B	B	D	A	A
Approach Delay (s)		32.1			32.6			19.2			19.0	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	22.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	84.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
25: Laurel Road & Empire Avenue

Existing PM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			↰↑	↱
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	25	173	20	61	89	113	16	388	42	121	254	19
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	27	184	21	65	95	120	17	413	45	129	270	20

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total (vph)	232	280	474	399	20
Volume Left (vph)	27	65	17	129	0
Volume Right (vph)	21	120	45	0	20
Hadj (s)	0.00	-0.18	-0.02	0.20	-0.67
Departure Headway (s)	8.6	8.2	7.6	8.2	7.3
Degree Utilization, x	0.55	0.63	1.00	0.91	0.04
Capacity (veh/h)	400	422	474	440	489
Control Delay (s)	21.6	24.3	68.7	51.5	9.4
Approach Delay (s)	21.6	24.3	68.7	49.5	
Approach LOS	C	C	F	E	

Intersection Summary			
Delay	46.3		
HCM Level of Service	E		
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: Existing                                             11/06/06
========================================================================
INTERSECTION     6 Hillcrest/18th St                 Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------            27  117   50
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    39 ---  1.0   1.0  1.0  1.0   1.1 ---   22  RIGHT
                                                          STREET NAME:
THRU   394 ---> 2.1  (NO. OF LANES)   2.1<---  292  THRU  18th St

RIGHT  233 ---  1.1   1.0  1.1  1.1   1.0 ---  212  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 158  151  237                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Hillcrest
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     237        237       1650     0.1436
    THRU (T)      151        151       1650     0.0915
    LEFT (L)      158        158       1650     0.0958
    T + R                    388       1650     0.2352     0.2352
------------------------------------------------------------------------
SB  RIGHT (R)      27          0 *     1650     0.0000
    THRU (T)      117        117       1650     0.0709     0.0709
    LEFT (L)       50         50       1650     0.0303
------------------------------------------------------------------------
EB  RIGHT (R)     233        233       1650     0.1412
    THRU (T)      394        394       3300     0.1194
    LEFT (L)       39         39       1650     0.0236
    T + R                    627       3300     0.1900     0.1900
------------------------------------------------------------------------
WB  RIGHT (R)      22         22       1650     0.0133
    THRU (T)      292        292       3300     0.0885
    LEFT (L)      212        212       1650     0.1285     0.1285
    T + R                    314       3300     0.0952
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.62
     INTERSECTION LEVEL OF SERVICE:                             B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=EX.INT,VOL=EX.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: Existing                                             11/06/06
========================================================================
INTERSECTION     7 Viera/18th St                     Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            30   42   30
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    32 ---  1.0   1.1  1.1  1.1   1.1 ---   23  RIGHT
                                                          STREET NAME:
THRU   463 ---> 2.0  (NO. OF LANES)   1.1<---  322  THRU  18th St

RIGHT  108 ---  1.0   1.1  1.1  1.0   1.0 ---    3  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  82   14    4                         Urb=N, Rur=N
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Viera
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)       4          1 *     1650     0.0006
    THRU (T)       14         14       1650     0.0085
    LEFT (L)       82         82       1650     0.0497     0.0497
    T + L                     96       1650     0.0582
------------------------------------------------------------------------
SB  RIGHT (R)      30         30       1650     0.0182
    THRU (T)       42         42       1650     0.0255
    LEFT (L)       30         30       1650     0.0182
    T + R                     72       1650     0.0436
    T + L                     72       1650     0.0436
    T + R + L                102       1650     0.0618     0.0618
------------------------------------------------------------------------
EB  RIGHT (R)     108         26 *     1650     0.0158
    THRU (T)      463        463       3300     0.1403
    LEFT (L)       32         32       1650     0.0194     0.0194
------------------------------------------------------------------------
WB  RIGHT (R)      23         23       1650     0.0139
    THRU (T)      322        322       1650     0.1952
    LEFT (L)        3          3       1650     0.0018
    T + R                    345       1650     0.2091     0.2091
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.34
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=EX.INT,VOL=EX.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: Existing                                             11/06/06
========================================================================
INTERSECTION     9 SR 160 SB Ramp/Main Street        Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            14   30   74
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    13 ---  1.0   1.1  1.1  1.0   1.0 ---   96  RIGHT
                                                          STREET NAME:
THRU   334 ---> 2.1  (NO. OF LANES)   2.0<---  282  THRU  Main Street

RIGHT   54 ---  1.1   1.0  1.1  1.1   2.0 ---  849  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  10   16  114                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 SB Ramp
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     114        114       1650     0.0691
    THRU (T)       16         16       1650     0.0097
    LEFT (L)       10         10       1650     0.0061
    T + R                    130       1650     0.0788     0.0788
------------------------------------------------------------------------
SB  RIGHT (R)      14         14       1650     0.0085
    THRU (T)       30         30       1650     0.0182
    LEFT (L)       74         74       1650     0.0448     0.0448
    T + R                     44       1650     0.0267
------------------------------------------------------------------------
EB  RIGHT (R)      54         54       1650     0.0327
    THRU (T)      334        334       3300     0.1012
    LEFT (L)       13         13       1650     0.0079
    T + R                    388       3300     0.1176     0.1176
------------------------------------------------------------------------
WB  RIGHT (R)      96         22 *     1650     0.0133
    THRU (T)      282        282       3300     0.0855
    LEFT (L)      849        849       3000     0.2830     0.2830
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.52
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=EX.INT,VOL=EX.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: Existing                                             11/06/06
========================================================================
INTERSECTION    10 SR 160 NB Ramp/Main Street        Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0    0    0
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  RIGHT
                                                          STREET NAME:
THRU   491 ---> 2.1  (NO. OF LANES)   2.0<--- 1164  THRU  Main Street

RIGHT   31 ---  1.1   1.0  0.0  2.0   1.0 ---   48  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  63    0 1585                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 NB Ramp
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)    1585       1537 *     3127     0.4915     0.4915
    LEFT (L)       63         63       1720     0.0366
------------------------------------------------------------------------
EB  RIGHT (R)      31         31       1720     0.0180
    THRU (T)      491        491       3440     0.1427
    T + R                    522       3440     0.1517
------------------------------------------------------------------------
WB  THRU (T)     1164       1164       3440     0.3384     0.3384
    LEFT (L)       48         48       1720     0.0279
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.83
     INTERSECTION LEVEL OF SERVICE:                             D
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=EX.INT,VOL=EX.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: Existing                                             11/06/06
========================================================================
INTERSECTION    11 Neroly/Main Street                Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------            57  127  339
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    58 ---  1.0   1.5  1.1  2.1   1.0 ---  161  RIGHT
                                                          STREET NAME:
THRU  1506 ---> 2.1  (NO. OF LANES)   3.0<---  904  THRU  Main Street

RIGHT  484 ---  1.1   1.0  1.1  1.1   1.0 ---   18  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 279   84   38                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Neroly
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY   RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      38         38       1650     0.0230
    THRU (T)       84         84       1650     0.0509
    LEFT (L)      279        279       1650     0.1691     0.1691
    T + R                    122       1650     0.0739
------------------------------------------------------------------------
SB  RIGHT (R)      57          0 *     1650     0.0000
    THRU (T)      127        127       1650     0.0770
    LEFT (L)      339        339       3000     0.1130
    T + L                    466       3000     0.1553     0.1553
------------------------------------------------------------------------
EB  RIGHT (R)     484        484       1650     0.2933
    THRU (T)     1506       1506       3300     0.4564
    LEFT (L)       58         58       1650     0.0352
    T + R                   1990       3300     0.6030     0.6030
------------------------------------------------------------------------
WB  RIGHT (R)     161          0 *     1650     0.0000
    THRU (T)      904        904       4950     0.1826
    LEFT (L)       18         18       1650     0.0109     0.0109
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.94
     INTERSECTION LEVEL OF SERVICE:                             E
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=EX.INT,VOL=EX.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: Existing                                             11/06/06
========================================================================
INTERSECTION    14 Big Break/Main Street             Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------           101   37   34
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   250 ---  1.0   1.0  1.1  1.1   1.0 ---   58  RIGHT
                                                          STREET NAME:
THRU  1337 ---> 2.0  (NO. OF LANES)   2.0<---  863  THRU  Main Street

RIGHT  164 ---  1.0   1.0  1.1  1.1   1.0 ---   64  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  68   52   88                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Big Break
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY   RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      88         88       1650     0.0533
    THRU (T)       52         52       1650     0.0315
    LEFT (L)       68         68       1650     0.0412
    T + R                    140       1650     0.0848     0.0848
------------------------------------------------------------------------
SB  RIGHT (R)     101          0 *     1650     0.0000
    THRU (T)       37         37       1650     0.0224
    LEFT (L)       34         34       1650     0.0206     0.0206
    T + L                     71       1650     0.0430
------------------------------------------------------------------------
EB  RIGHT (R)     164         96 *     1650     0.0582
    THRU (T)     1337       1337       3300     0.4052     0.4052
    LEFT (L)      250        250       1650     0.1515
------------------------------------------------------------------------
WB  RIGHT (R)      58         24 *     1650     0.0145
    THRU (T)      863        863       3300     0.2615
    LEFT (L)       64         64       1650     0.0388     0.0388
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.55
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=EX.INT,VOL=EX.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: Existing                                             11/06/06
========================================================================
INTERSECTION    17 Empire Ave/Oakley Road            Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------            66  500  132
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? Y
LEFT    53 ---  2.1   1.0  1.0  1.0   1.0 ---   61  RIGHT
                                                          STREET NAME:
THRU    31 ---> 1.1  (NO. OF LANES)   1.1<---   33  THRU  Oakley Road

RIGHT  255 ---  1.0   1.0  2.1  1.1   1.1 ---   48  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 134  428   10                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire Ave
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY   RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      10         10       1720     0.0058
    THRU (T)      428        428       3440     0.1244
    LEFT (L)      134        134       1720     0.0779     0.0779
    T + R                    438       3440     0.1273
------------------------------------------------------------------------
SB  RIGHT (R)      66         37 *     1720     0.0215
    THRU (T)      500        500       1720     0.2907     0.2907
    LEFT (L)      132        132       1720     0.0767
------------------------------------------------------------------------
EB  RIGHT (R)     255        121 *     1720     0.0703     0.0703
    THRU (T)       31         31       1720     0.0180
    LEFT (L)       53         53       3127     0.0169
    T + L                     84       3127     0.0269
------------------------------------------------------------------------
WB  RIGHT (R)      61          0 *     1720     0.0000
    THRU (T)       33         33       1720     0.0192
    LEFT (L)       48         48       1720     0.0279
    T + L                     81       1720     0.0471     0.0471
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.49
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=EX.INT,VOL=EX.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: Existing                                             11/06/06
========================================================================
INTERSECTION    18 Empire Avenue/Main Street         Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       2-PHASE SIGNAL
-----------            12   14   14
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    45 ---  1.0   1.0  1.1  1.1   1.1 ---    9  RIGHT
                                                          STREET NAME:
THRU  1046 ---> 2.0  (NO. OF LANES)   2.1<---  689  THRU  Main Street

RIGHT  511 ---  1.0   2.0  1.0  1.0   1.0 ---  173  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 366   28  148                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY   RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     148          0 *     1800     0.0000
    THRU (T)       28         28       1800     0.0156
    LEFT (L)      366        366       3273     0.1118     0.1118
------------------------------------------------------------------------
SB  RIGHT (R)      12          0 *     1800     0.0000
    THRU (T)       14         14       1800     0.0078
    LEFT (L)       14         14       1800     0.0078
    T + L                     28       1800     0.0156     0.0156
------------------------------------------------------------------------
EB  RIGHT (R)     511        310 *     1800     0.1722
    THRU (T)     1046       1046       3600     0.2906     0.2906
    LEFT (L)       45         45       1800     0.0250
------------------------------------------------------------------------
WB  RIGHT (R)       9          9       1800     0.0050
    THRU (T)      689        689       3600     0.1914
    LEFT (L)      173        173       1800     0.0961     0.0961
    T + R                    698       3600     0.1939
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.51
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=EX.INT,VOL=EX.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: Existing                                             11/06/06
========================================================================
INTERSECTION    19 Vintage/Main Street               Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------           108    0  167
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   169 ---  1.0   1.0  0.0  1.0   1.1 ---  159  RIGHT
                                                          STREET NAME:
THRU  1103 ---> 2.0  (NO. OF LANES)   2.1<---  787  THRU  Main Street

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Vintage
========================================================================
               ORIGINAL   ADJUSTED                 V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)     108          0 *     1720     0.0000
    LEFT (L)      167        167       1720     0.0971     0.0971
------------------------------------------------------------------------
EB  THRU (T)     1103       1103       3440     0.3206
    LEFT (L)      169        169       1720     0.0983     0.0983
------------------------------------------------------------------------
WB  RIGHT (R)     159        159       1720     0.0924
    THRU (T)      787        787       3440     0.2288
    T + R                    946       3440     0.2750     0.2750
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.47
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=EX.INT,VOL=EX.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: Existing                                             11/06/06
========================================================================
INTERSECTION    20 O'Hara Avenue/Main Street         Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             1    0    1
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     3 ---  1.0   1.1  1.1  1.1   1.1 ---    2  RIGHT
                                                          STREET NAME:
THRU  1108 ---> 1.0  (NO. OF LANES)   1.1<---  890  THRU  Main Street

RIGHT  157 ---  1.0   1.0  1.1  1.1   1.0 ---   12  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  56    0   40                         Urb=N, Rur=B
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: O'Hara Avenue
========================================================================
               ORIGINAL   ADJUSTED                 V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      40         40       1720     0.0233
    THRU (T)        0          0       1720     0.0000
    LEFT (L)       56         56       1720     0.0326     0.0326
    T + R                     40       1720     0.0233
------------------------------------------------------------------------
SB  RIGHT (R)       1          1       1720     0.0006
    THRU (T)        0          0       1720     0.0000
    LEFT (L)        1          1       1720     0.0006
    T + R                      1       1720     0.0006
    T + L                      1       1720     0.0006
    T + R + L                  2       1720     0.0012     0.0012
------------------------------------------------------------------------
EB  RIGHT (R)     157        101 *     1720     0.0587
    THRU (T)     1108       1108       1720     0.6442     0.6442
    LEFT (L)        3          3       1720     0.0017
------------------------------------------------------------------------
WB  RIGHT (R)       2          2       1720     0.0012
    THRU (T)      890        890       1720     0.5174
    LEFT (L)       12         12       1720     0.0070     0.0070
    T + R                    892       1720     0.5186
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.68
     INTERSECTION LEVEL OF SERVICE:                             B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=EX.INT,VOL=EX.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: Existing                                             11/06/06
========================================================================
INTERSECTION    21 Empire Avenue/Cypress Road        Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0  527  220
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  2.0  1.0   1.0 ---  219  RIGHT
                                                          STREET NAME:
THRU     0 ---> 0.0  (NO. OF LANES)   0.0<---    0  THRU  Cypress Road

RIGHT    0 ---  0.0   0.0  2.1  1.1   1.0 ---   23  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0  411   47                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire Avenue
========================================================================
               ORIGINAL   ADJUSTED                 V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      47         47       1720     0.0273
    THRU (T)      411        411       3440     0.1195
    T + R                    458       3440     0.1331     0.1331
------------------------------------------------------------------------
SB  THRU (T)      527        527       3440     0.1532
    LEFT (L)      220        220       1720     0.1279     0.1279
------------------------------------------------------------------------
WB  RIGHT (R)     219          0 *     1720     0.0000
    LEFT (L)       23         23       1720     0.0134     0.0134
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.27
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=EX.INT,VOL=EX.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: Existing                                             11/06/06
========================================================================
INTERSECTION    22 Main Street/Cypress               Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            37  597  379
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    29 ---  1.0   1.0  2.0  1.0   1.0 ---  288  RIGHT
                                                          STREET NAME:
THRU    80 ---> 1.0  (NO. OF LANES)   1.0<---  114  THRU  Cypress

RIGHT   46 ---  1.0   1.0  2.0  1.0   1.0 ---   53  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  53  438   86                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Main Street
========================================================================
               ORIGINAL   ADJUSTED                 V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      86         33 *     1650     0.0200
    THRU (T)      438        438       3300     0.1327     0.1327
    LEFT (L)       53         53       1650     0.0321
------------------------------------------------------------------------
SB  RIGHT (R)      37          8 *     1650     0.0048
    THRU (T)      597        597       3300     0.1809
    LEFT (L)      379        379       1650     0.2297     0.2297
------------------------------------------------------------------------
EB  RIGHT (R)      46          0 *     1650     0.0000
    THRU (T)       80         80       1650     0.0485
    LEFT (L)       29         29       1650     0.0176     0.0176
------------------------------------------------------------------------
WB  RIGHT (R)     288          0 *     1650     0.0000
    THRU (T)      114        114       1650     0.0691     0.0691
    LEFT (L)       53         53       1650     0.0321
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.45
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=EX.INT,VOL=EX.PM,CAP=
```

Near Term (2010) No Project AM

HCM Signalized Intersection Capacity Analysis — 2010 AM
1: Wilbur Avenue & Minaker Drive — 11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↰↑	↱		↰↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	0.96		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.97	1.00
Satd. Flow (prot)	1770	3386		1770	3529			1777	1583		1803	1583
Flt Permitted	0.95	1.00		0.95	1.00			0.72	1.00		0.83	1.00
Satd. Flow (perm)	1770	3386		1770	3529			1346	1583		1538	1583
Volume (vph)	20	100	40	10	480	10	140	5	20	10	5	20
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	21	104	42	10	500	10	146	5	21	10	5	21
RTOR Reduction (vph)	0	21	0	0	1	0	0	0	16	0	0	16
Lane Group Flow (vph)	21	125	0	10	509	0	0	151	5	0	15	5
Turn Type	Prot			Prot			Perm		Perm	Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		4
Actuated Green, G (s)	1.3	24.7		1.2	24.6			10.4	10.4		10.4	10.4
Effective Green, g (s)	1.3	24.7		1.2	24.6			10.4	10.4		10.4	10.4
Actuated g/C Ratio	0.03	0.51		0.02	0.51			0.22	0.22		0.22	0.22
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	48	1732		44	1797			290	341		331	341
v/s Ratio Prot	c0.01	0.04		0.01	c0.14							
v/s Ratio Perm								c0.11	0.00		0.01	0.00
v/c Ratio	0.44	0.07		0.23	0.28			0.52	0.01		0.05	0.01
Uniform Delay, d1	23.1	6.0		23.1	6.8			16.7	14.9		15.0	14.9
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	6.3	0.0		2.6	0.1			1.7	0.0		0.1	0.0
Delay (s)	29.4	6.0		25.7	6.9			18.4	14.9		15.1	14.9
Level of Service	C	A		C	A			B	B		B	B
Approach Delay (s)		8.9			7.2			18.0			15.0	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	9.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	48.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	38.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis — 2010 AM
2: Wilbur Avenue & Viera Avenue — 11/6/2006

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱		↰	↑	↰↱	
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	130	20	10	440	70	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	141	22	11	478	76	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			163		652	152
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			163		652	152
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		82	98
cM capacity (veh/h)			1416		429	894

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	163	11	478	98
Volume Left	0	11	0	76
Volume Right	22	0	0	22
cSH	1700	1416	1700	485
Volume to Capacity	0.10	0.01	0.28	0.20
Queue Length 95th (ft)	0	1	0	19
Control Delay (s)	0.0	7.6	0.0	14.3
Lane LOS		A		B
Approach Delay (s)	0.0	0.2		14.3
Approach LOS				B

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	34.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis — 2010 AM
3: Wilbur Avenue & SR 160 SB Off — 11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱		↰	↑↑					↰		↱
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	130	40	10	330	0	0	0	0	50	0	160
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	134	41	10	340	0	0	0	0	52	0	165
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	340			175			345	515	155	515	536	170
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	340			175			345	515	155	515	536	170
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	100	100	88	100	80
cM capacity (veh/h)	1216			1399			468	458	864	440	446	844

Direction, Lane #	EB 1	WB 1	WB 2	WB 3	SB 1	SB 2
Volume Total	175	10	170	170	52	165
Volume Left	0	10	0	0	52	0
Volume Right	41	0	0	0	0	165
cSH	1700	1399	1700	1700	440	844
Volume to Capacity	0.10	0.01	0.10	0.10	0.12	0.20
Queue Length 95th (ft)	0	1	0	0	10	18
Control Delay (s)	0.0	7.6	0.0	0.0	14.3	10.3
Lane LOS		A			B	B
Approach Delay (s)	0.0	0.2			11.2	
Approach LOS					B	

Intersection Summary			
Average Delay	3.4		
Intersection Capacity Utilization	28.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis — 2010 AM
4: Wilbur Avenue & SR 160 NB On — 11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑			↑↱		↰		↱			
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	30	150	0	0	300	110	40	0	20	0	0	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	32	160	0	0	319	117	43	0	21	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	436			160			383	660	80	521	601	218
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	436			160			383	660	80	521	601	218
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			100			92	100	98	100	100	100
cM capacity (veh/h)	1120			1417			538	371	964	419	401	786

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2
Volume Total	32	80	80	213	223	43	21
Volume Left	32	0	0	0	0	43	0
Volume Right	0	0	0	0	117	0	21
cSH	1120	1700	1700	1700	1700	538	964
Volume to Capacity	0.03	0.05	0.05	0.13	0.13	0.08	0.02
Queue Length 95th (ft)	2	0	0	0	0	6	2
Control Delay (s)	8.3	0.0	0.0	0.0	0.0	12.3	8.8
Lane LOS	A					B	A
Approach Delay (s)	1.4			0.0		11.1	
Approach LOS						B	

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	28.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
5: Wilbur Avenue & Live Oak Ave

2010 AM
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	30	0	140	0	0	0	390	30	0	0	30	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	0	152	0	0	0	424	33	0	0	33	22

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1
Volume Total (vph)	33	152	0	457	54
Volume Left (vph)	33	0	0	424	0
Volume Right (vph)	0	152	0	0	22
Hadj (s)	0.53	-0.67	0.00	0.22	-0.21
Departure Headway (s)	6.3	5.1	5.6	4.7	4.7
Degree Utilization, x	0.06	0.21	0.00	0.59	0.07
Capacity (veh/h)	532	654	583	753	706
Control Delay (s)	8.5	8.3	8.6	14.3	8.1
Approach Delay (s)	8.3		0.0	14.3	8.1
Approach LOS	A		A	B	A

Intersection Summary			
Delay	12.2		
HCM Level of Service	B		
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
6: E 18th Street & Hillcrest Avenue

2010 AM
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑	↱	↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3362		1770	3498		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3362		1770	3498		1770	1863	1583	1770	1863	1583
Volume (vph)	10	140	70	180	350	30	190	100	140	40	70	40
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	11	156	78	200	389	33	211	111	156	44	78	44
RTOR Reduction (vph)	0	54	0	0	5	0	0	0	126	0	0	38
Lane Group Flow (vph)	11	180	0	200	417	0	211	111	30	44	78	6
Turn Type	Prot			Prot			Split		Perm	Split		Perm
Protected Phases	1	6		5	2		8	8		4	4	
Permitted Phases									8			4
Actuated Green, G (s)	0.3	16.8		8.7	25.7		10.4	10.4	10.4	6.6	6.6	6.6
Effective Green, g (s)	1.3	18.8		10.2	27.7		11.9	11.9	11.9	8.1	8.1	8.1
Actuated g/C Ratio	0.02	0.31		0.17	0.45		0.20	0.20	0.20	0.13	0.13	0.13
Clearance Time (s)	4.0	5.0		4.5	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	38	1036		296	1588		345	363	309	235	247	210
v/s Ratio Prot	0.01	0.05		c0.11	c0.12		c0.12	0.06		0.02	c0.04	
v/s Ratio Perm									0.02			0.00
v/c Ratio	0.29	0.17		0.68	0.26		0.61	0.31	0.10	0.19	0.32	0.03
Uniform Delay, d1	29.4	15.4		23.8	10.3		22.4	21.0	20.1	23.5	23.9	23.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.2	0.1		6.0	0.1		3.2	0.5	0.1	0.4	0.7	0.1
Delay (s)	33.6	15.5		29.8	10.4		25.6	21.5	20.3	23.9	24.7	23.1
Level of Service	C	B		C	B		C	C	C	C	C	C
Approach Delay (s)		16.3			16.7			22.9			24.1	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM Average Control Delay	19.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	61.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	43.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
7: E 18th Street & Viera Avenue

2010 AM
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↱			↰↑	↱		✥	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	0.96			1.00	0.85		0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00		0.99	
Satd. Flow (prot)	1770	3539	1583	1770	1787			1791	1583		1694	
Flt Permitted	0.39	1.00	1.00	0.62	1.00			0.80	1.00		0.96	
Satd. Flow (perm)	733	3539	1583	1154	1787			1483	1583		1635	
Volume (vph)	70	190	40	10	350	130	120	30	10	10	20	50
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	78	211	44	11	389	144	133	33	11	11	22	56
RTOR Reduction (vph)	0	0	17	0	19	0	0	0	8	0	42	0
Lane Group Flow (vph)	78	211	27	11	514	0	0	166	3	0	47	0
Turn Type	Perm		Perm	Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	26.5	26.5	26.5	26.5	26.5			10.3	10.3		10.3	
Effective Green, g (s)	27.5	27.5	27.5	27.5	27.5			11.3	11.3		11.3	
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61			0.25	0.25		0.25	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	450	2172	972	708	1097			374	399		412	
v/s Ratio Prot		0.06			c0.29							
v/s Ratio Perm	0.11		0.02	0.01				c0.11	0.00		0.03	
v/c Ratio	0.17	0.10	0.03	0.02	0.47			0.44	0.01		0.11	
Uniform Delay, d1	3.7	3.6	3.4	3.4	4.7			14.1	12.5		12.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.2	0.0	0.0	0.0	0.3			0.8	0.0		0.1	
Delay (s)	3.9	3.6	3.4	3.4	5.0			14.9	12.6		13.0	
Level of Service	A	A	A	A	A			B	B		B	
Approach Delay (s)		3.6			5.0			14.8			13.0	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	6.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	44.8	Sum of lost time (s)	6.0
Intersection Capacity Utilization	55.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: E 18th Street & Phillips Lane

2010 AM
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱	↰	↱		↰↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.97	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.93		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3526		1770	3539	1583	1770	1723		3433	1653	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3526		1770	3539	1583	1770	1723		3433	1653	
Volume (vph)	40	210	5	10	470	30	10	10	10	20	10	30
Peak-hour factor, PHF	0.92	0.90	0.90	0.90	0.90	0.92	0.90	0.92	0.90	0.92	0.92	0.92
Adj. Flow (vph)	43	233	6	11	522	33	11	11	11	22	11	33
RTOR Reduction (vph)	0	2	0	0	0	24	0	9	0	0	28	0
Lane Group Flow (vph)	43	237	0	11	522	9	11	13	0	22	16	0
Turn Type	Prot			Prot		Perm	Split			Split		
Protected Phases	5	2		1	6		7	7		3	3	
Permitted Phases						6						
Actuated Green, G (s)	1.8	13.4		0.6	12.2	12.2	6.3	6.3		6.4	6.4	
Effective Green, g (s)	1.8	13.4		0.6	12.2	12.2	6.3	6.3		6.4	6.4	
Actuated g/C Ratio	0.04	0.31		0.01	0.29	0.29	0.15	0.15		0.15	0.15	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	75	1107		25	1011	452	261	254		515	248	
v/s Ratio Prot	c0.02	0.07		0.01	c0.15		0.01	c0.01		0.01	c0.01	
v/s Ratio Perm						0.01						
v/c Ratio	0.57	0.21		0.44	0.52	0.02	0.04	0.05		0.04	0.06	
Uniform Delay, d1	20.1	10.8		20.9	12.8	11.0	15.6	15.6		15.5	15.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.2	0.1		11.9	0.4	0.0	0.1	0.1		0.0	0.1	
Delay (s)	30.2	10.9		32.8	13.2	11.0	15.7	15.7		15.6	15.7	
Level of Service	C	B		C	B	B	B	B		B	B	
Approach Delay (s)		13.8			13.5			15.7			15.6	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	13.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	42.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	33.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
9: E 18th Street & SR 160 SB Off

2010 AM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰↰	↑↑	↱	↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.87		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3396		3335	3438	1538	1719	1578		1719	1674	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.73	1.00		0.70	1.00	
Satd. Flow (perm)	1719	3396		3335	3438	1538	1320	1578		1263	1674	
Volume (vph)	10	220	20	840	430	60	30	10	60	30	20	20
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	11	234	21	894	457	64	32	11	64	32	21	21
RTOR Reduction (vph)	0	5	0	0	0	12	0	60	0	0	20	0
Lane Group Flow (vph)	11	250	0	894	457	52	32	15	0	32	22	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases						6	8			4		
Actuated Green, G (s)	1.0	40.8		40.2	80.0	80.0	6.0	6.0		6.0	6.0	
Effective Green, g (s)	1.0	41.8		40.2	81.0	81.0	6.0	6.0		6.0	6.0	
Actuated g/C Ratio	0.01	0.42		0.40	0.81	0.81	0.06	0.06		0.06	0.06	
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	4.0	4.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	17	1420		1341	2785	1246	79	95		76	100	
v/s Ratio Prot	c0.01	c0.07		c0.27	0.13			0.01			0.01	
v/s Ratio Perm						0.03	0.02			c0.03		
v/c Ratio	0.65	0.18		0.67	0.16	0.04	0.41	0.16		0.42	0.22	
Uniform Delay, d1	49.3	18.3		24.4	2.1	1.9	45.3	44.6		45.3	44.8	
Progression Factor	1.00	1.00		0.67	0.31	0.06	1.00	1.00		1.00	1.00	
Incremental Delay, d2	62.0	0.3		1.2	0.1	0.1	1.2	0.3		1.4	0.4	
Delay (s)	111.3	18.6		17.5	0.8	0.2	46.5	44.9		46.7	45.2	
Level of Service	F	B		B	A	A	D	D		D	D	
Approach Delay (s)		22.4			11.3			45.4			45.8	
Approach LOS		C			B			D			D	

Intersection Summary			
HCM Average Control Delay	16.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Main Street & SR 160 NB On

2010 AM
11/6/2006

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↱		↰	↑↑	↰	↱↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	1.00	0.88
Frt	0.98		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3372		1719	3438	1719	2707
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3372		1719	3438	1719	2707
Volume (vph)	270	40	60	1240	90	580
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	297	44	66	1363	99	637
RTOR Reduction (vph)	8	0	0	0	0	429
Lane Group Flow (vph)	333	0	66	1363	99	208
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Turn Type			Prot			pm+ov
Protected Phases	2		1	6	8	1
Permitted Phases						8
Actuated Green, G (s)	54.4		23.0	82.4	8.6	31.6
Effective Green, g (s)	55.4		24.0	83.4	8.6	32.6
Actuated g/C Ratio	0.55		0.24	0.83	0.09	0.33
Clearance Time (s)	5.0		5.0	5.0	4.0	5.0
Vehicle Extension (s)	4.0		3.0	4.0	2.0	3.0
Lane Grp Cap (vph)	1868		413	2867	148	991
v/s Ratio Prot	0.10		0.04	c0.40	c0.06	0.05
v/s Ratio Perm						0.03
v/c Ratio	0.18		0.16	0.48	0.67	0.21
Uniform Delay, d1	11.0		30.0	2.3	44.3	24.4
Progression Factor	0.26		1.09	0.46	1.00	1.00
Incremental Delay, d2	0.2		0.2	0.5	8.6	0.1
Delay (s)	3.1		32.8	1.6	52.9	24.5
Level of Service	A		C	A	D	C
Approach Delay (s)	3.1			3.0	28.3	
Approach LOS	A			A	C	

Intersection Summary			
HCM Average Control Delay	10.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Main Street & Live Oak Ave

2010 AM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑↑	↱	↰↰	↱		↰	↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.91	1.00	0.97	1.00		0.95	0.95	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (prot)	1719	3314		1719	4940	1538	3335	1725		1633	1689	1538
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (perm)	1719	3314		1719	4940	1538	3335	1725		1633	1689	1538
Volume (vph)	60	600	190	10	1020	330	200	110	50	100	50	80
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	652	207	11	1109	359	217	120	54	109	54	87
RTOR Reduction (vph)	0	20	0	0	0	174	0	20	0	0	0	77
Lane Group Flow (vph)	65	839	0	11	1109	185	217	154	0	79	84	10
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot		Perm	Split			Split		Perm
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases						6						7
Actuated Green, G (s)	8.0	57.3		1.2	50.5	50.5	12.5	12.5		12.0	12.0	12.0
Effective Green, g (s)	8.0	58.3		1.2	51.5	51.5	12.5	12.5		12.0	12.0	12.0
Actuated g/C Ratio	0.08	0.58		0.01	0.52	0.52	0.12	0.12		0.12	0.12	0.12
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	138	1932		21	2544	792	417	216		196	203	185
v/s Ratio Prot	c0.04	c0.25		0.01	0.22		0.07	c0.09		0.05	c0.05	
v/s Ratio Perm						0.12						0.01
v/c Ratio	0.47	0.43		0.52	0.44	0.23	0.52	0.71		0.40	0.41	0.06
Uniform Delay, d1	44.0	11.6		49.1	15.2	13.4	40.9	42.0		40.7	40.7	39.0
Progression Factor	0.98	0.88		0.97	0.89	0.67	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.9	0.7		9.5	0.5	0.6	0.5	8.9		0.5	0.5	0.0
Delay (s)	44.0	10.9		56.9	14.0	9.6	41.5	50.9		41.2	41.2	39.0
Level of Service	D	B		E	B	A	D	D		D	D	D
Approach Delay (s)		13.2			13.3			45.7			40.5	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM Average Control Delay	19.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
12: Main Street & Sandy Lane

2010 AM
11/6/2006

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↱		↰	↑↑	↰↱	
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	740	10	10	1350	10	10
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	822	11	11	1500	11	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					TWLTL	
Median storage veh)					0	
Upstream signal (ft)	1017					
pX, platoon unblocked			0.95		0.95	0.95
vC, conflicting volume			833		1600	417
vC1, stage 1 conf vol					828	
vC2, stage 2 conf vol					772	
vCu, unblocked vol			766		1577	326
tC, single (s)			4.2		6.9	7.0
tC, 2 stage (s)					5.9	
tF (s)			2.2		3.5	3.3
p0 queue free %			99		93	98
cM capacity (veh/h)			779		166	625

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	548	285	11	750	750	22
Volume Left	0	0	11	0	0	11
Volume Right	0	11	0	0	0	11
cSH	1700	1700	779	1700	1700	262
Volume to Capacity	0.32	0.17	0.01	0.44	0.44	0.08
Queue Length 95th (ft)	0	0	1	0	0	7
Control Delay (s)	0.0	0.0	9.7	0.0	0.0	20.0
Lane LOS			A			C
Approach Delay (s)	0.0		0.1			20.0
Approach LOS						C

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
13: Main Street & Live Oak Ave

2010 AM
11/6/2006

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↱		↰	↑↑	↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3411		1719	3438	1719	1538
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3411		1719	3438	1719	1538
Volume (vph)	710	40	30	1270	90	30
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	789	44	33	1411	100	33
RTOR Reduction (vph)	2	0	0	0	0	30
Lane Group Flow (vph)	831	0	33	1411	100	3
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Turn Type			Prot			custom
Protected Phases	2		1	6		
Permitted Phases				6	8	3
Actuated Green, G (s)	72.4		5.0	81.4	9.6	8.6
Effective Green, g (s)	73.4		5.0	82.4	9.6	9.6
Actuated g/C Ratio	0.73		0.05	0.82	0.10	0.10
Clearance Time (s)	5.0		4.0	5.0	4.0	5.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2504		86	2833	165	148
v/s Ratio Prot	0.24		0.02	c0.41		
v/s Ratio Perm					c0.06	0.00
v/c Ratio	0.33		0.38	0.50	0.61	0.02
Uniform Delay, d1	4.7		46.0	2.6	43.4	40.9
Progression Factor	0.84		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3		2.8	0.6	6.2	0.1
Delay (s)	4.3		48.8	3.3	49.5	41.0
Level of Service	A		D	A	D	D
Approach Delay (s)	4.3			4.3	47.4	
Approach LOS	A			A	D	

Intersection Summary			
HCM Average Control Delay	6.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
14: Main Street & Big Break Road

2010 AM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↱			↲	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.97	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1647			1757	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.60	1.00			0.78	1.00
Satd. Flow (perm)	1719	3438	1538	1719	3438	1538	1084	1647			1417	1538
Volume (vph)	70	650	30	50	1010	60	60	20	30	60	40	200
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	78	722	33	56	1122	67	67	22	33	67	44	222
RTOR Reduction (vph)	0	0	11	0	0	23	0	29	0	0	0	192
Lane Group Flow (vph)	78	722	22	56	1122	44	67	26	0	0	111	30
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot		custom	Prot		custom	Perm			Perm		Perm
Protected Phases	5			1				3			7	
Permitted Phases		2	2		6	6	3			7		7
Actuated Green, G (s)	8.5	66.9	66.9	6.7	65.1	65.1	12.4	12.4			12.4	12.4
Effective Green, g (s)	8.5	67.9	67.9	6.7	66.1	66.1	13.4	13.4			13.4	13.4
Actuated g/C Ratio	0.08	0.68	0.68	0.07	0.66	0.66	0.13	0.13			0.13	0.13
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0	5.0	5.0	5.0			5.0	5.0
Vehicle Extension (s)	3.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)	146	2334	1044	115	2273	1017	145	221			190	206
v/s Ratio Prot	c0.05			0.03				0.02				
v/s Ratio Perm		0.21	0.01		c0.33	0.03	0.06				c0.08	0.02
v/c Ratio	0.53	0.31	0.02	0.49	0.49	0.04	0.46	0.12			0.58	0.14
Uniform Delay, d1	43.9	6.5	5.2	45.0	8.5	5.9	40.0	38.1			40.7	38.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	3.7	0.3	0.0	1.2	0.8	0.1	0.9	0.1			2.9	0.1
Delay (s)	47.6	6.9	5.3	46.2	9.3	6.0	40.8	38.2			43.6	38.4
Level of Service	D	A	A	D	A	A	D	D			D	D
Approach Delay (s)		10.6			10.8			39.6			40.1	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM Average Control Delay	16.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
15: Oakley Road & Live Oak Ave

2010 AM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	30	20	10	70	110	60	260	20	50	130	10
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	11	33	22	11	77	121	66	286	22	55	143	11

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	66	209	374	209
Volume Left (vph)	11	11	66	55
Volume Right (vph)	22	121	22	11
Hadj (s)	-0.13	-0.30	0.03	0.06
Departure Headway (s)	5.7	5.2	5.0	5.3
Degree Utilization, x	0.10	0.30	0.52	0.30
Capacity (veh/h)	547	625	682	639
Control Delay (s)	9.3	10.5	13.3	10.5
Approach Delay (s)	9.3	10.5	13.3	10.5
Approach LOS	A	B	B	B

Intersection Summary			
Delay	11.6		
HCM Level of Service	B		
Intersection Capacity Utilization	40.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
16: Oakley Road & Live Oak Ave

2010 AM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	5	70	10	50	140	20	40	60	20	10	30	5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	78	11	56	156	22	44	67	22	11	33	6

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	94	233	133	50
Volume Left (vph)	6	56	44	11
Volume Right (vph)	11	22	22	6
Hadj (s)	-0.02	0.02	0.00	0.01
Departure Headway (s)	4.6	4.5	4.7	4.9
Degree Utilization, x	0.12	0.29	0.18	0.07
Capacity (veh/h)	739	762	709	677
Control Delay (s)	8.2	9.3	8.7	8.2
Approach Delay (s)	8.2	9.3	8.7	8.2
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.9		
HCM Level of Service	A		
Intersection Capacity Utilization	35.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
17: Oakley Road & Empire Avenue

2010 AM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↑	↱		↰↑	↱	↰	↑ ↑↱		↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95		1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1708	1583		1803	1583	1770	3521		1770	1863	1583
Flt Permitted	0.95	0.97	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1708	1583		1803	1583	1770	3521		1770	1863	1583
Volume (vph)	60	10	110	20	10	20	170	280	10	40	210	60
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	11	120	22	11	22	185	304	11	43	228	65
RTOR Reduction (vph)	0	0	110	0	0	20	0	2	0	0	0	38
Lane Group Flow (vph)	37	39	10	0	33	2	185	313	0	43	228	27
Turn Type	Split		Perm	Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8						6
Actuated Green, G (s)	5.9	5.9	5.9		4.7	4.7	10.6	35.9		2.1	27.4	27.4
Effective Green, g (s)	5.9	5.9	5.9		5.7	5.7	11.6	36.9		3.1	28.4	28.4
Actuated g/C Ratio	0.09	0.09	0.09		0.08	0.08	0.17	0.55		0.05	0.42	0.42
Clearance Time (s)	4.0	4.0	4.0		5.0	5.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	147	149	138		152	133	304	1922		81	783	665
v/s Ratio Prot	0.02	c0.02			c0.02		c0.10	0.09		0.02	c0.12	
v/s Ratio Perm			0.01			0.00						0.02
v/c Ratio	0.25	0.26	0.08		0.22	0.01	0.61	0.16		0.53	0.29	0.04
Uniform Delay, d1	28.8	28.8	28.3		28.9	28.4	25.9	7.7		31.5	12.9	11.6
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.9	0.9	0.2		0.7	0.0	3.4	0.0		6.5	0.2	0.0
Delay (s)	29.7	29.8	28.6		29.6	28.4	29.3	7.7		38.1	13.2	11.6
Level of Service	C	C	C		C	C	C	A		D	B	B
Approach Delay (s)		29.0			29.1			15.7			16.0	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	18.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	67.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	39.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: Main Street & Charles Way

2010 AM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑ ↑↱		↰↰	↑	↱		↰↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.99	1.00
Satd. Flow (prot)	1719	3539	1538	1770	3533		3335	1810	1583		1799	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.99	1.00
Satd. Flow (perm)	1719	3539	1538	1770	3533		3335	1810	1583		1799	1538
Volume (vph)	20	600	130	130	780	10	250	10	100	20	50	40
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	22	667	144	144	867	11	278	11	111	22	56	44
RTOR Reduction (vph)	0	0	92	0	1	0	0	0	89	0	0	42
Lane Group Flow (vph)	22	667	52	144	877	0	278	11	22	0	78	2
Heavy Vehicles (%)	5%	2%	5%	2%	2%	2%	5%	5%	2%	2%	5%	5%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	0.6	19.1	19.1	5.0	23.5		10.3	10.3	10.3		2.8	2.8
Effective Green, g (s)	1.6	20.1	20.1	6.0	24.5		11.3	11.3	11.3		2.8	2.8
Actuated g/C Ratio	0.03	0.36	0.36	0.11	0.44		0.20	0.20	0.20		0.05	0.05
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	49	1266	550	189	1540		671	364	318		90	77
v/s Ratio Prot	0.01	0.19		c0.08	c0.25		c0.08	0.01			c0.04	
v/s Ratio Perm			0.03						0.01			0.00
v/c Ratio	0.45	0.53	0.09	0.76	0.57		0.41	0.03	0.07		0.87	0.03
Uniform Delay, d1	26.9	14.3	12.0	24.4	11.9		19.6	18.0	18.2		26.5	25.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	6.4	0.4	0.1	16.5	0.5		0.4	0.0	0.1		53.4	0.2
Delay (s)	33.3	14.7	12.1	40.9	12.4		20.0	18.1	18.3		79.9	25.6
Level of Service	C	B	B	D	B		B	B	B		E	C
Approach Delay (s)		14.7			16.4			19.5			60.3	
Approach LOS		B			B			B			E	

Intersection Summary			
HCM Average Control Delay	18.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	56.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
19: Main Street & Vintage Parkway

2010 AM
11/6/2006

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑	↑ ↑↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3477		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3539	3477		1770	1583
Volume (vph)	70	630	750	100	180	150
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	78	700	833	111	200	167
RTOR Reduction (vph)	0	0	14	0	0	130
Lane Group Flow (vph)	78	700	930	0	200	37
Turn Type	Prot					Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	2.8	28.2	21.4		10.7	10.7
Effective Green, g (s)	2.8	29.2	22.4		10.7	10.7
Actuated g/C Ratio	0.06	0.61	0.47		0.22	0.22
Clearance Time (s)	4.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	103	2157	1626		395	354
v/s Ratio Prot	c0.04	0.20	c0.27		c0.11	
v/s Ratio Perm						0.02
v/c Ratio	0.76	0.32	0.57		0.51	0.11
Uniform Delay, d1	22.2	4.6	9.3		16.3	14.8
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	26.7	0.1	0.5		1.0	0.1
Delay (s)	48.9	4.6	9.8		17.3	14.9
Level of Service	D	A	A		B	B
Approach Delay (s)		9.1	9.8		16.2	
Approach LOS		A	A		B	

Intersection Summary			
HCM Average Control Delay	10.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	47.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: Main Street & O'Hara Avenue

2010 AM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑↱			↰↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85			0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1770	1863	1583	1770	1861		1770	1583			1695	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.75	1.00			0.90	
Satd. Flow (perm)	1770	1863	1583	1770	1861		1399	1583			1564	
Volume (vph)	5	670	90	30	750	5	90	0	30	5	0	5
Peak-hour factor, PHF	0.92	0.90	0.90	0.90	0.90	0.92	0.90	0.92	0.90	0.92	0.92	0.92
Adj. Flow (vph)	5	744	100	33	833	5	100	0	33	5	0	5
RTOR Reduction (vph)	0	0	32	0	0	0	0	28	0	0	4	0
Lane Group Flow (vph)	5	744	68	33	838	0	100	5	0	0	6	0
Turn Type	Prot		Perm	Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4				2			6		
Actuated Green, G (s)	0.9	51.6	51.6	1.9	52.6		10.1	10.1			10.6	
Effective Green, g (s)	0.9	52.6	52.6	1.9	53.6		10.6	10.6			10.6	
Actuated g/C Ratio	0.01	0.68	0.68	0.02	0.70		0.14	0.14			0.14	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		4.5	4.5			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	21	1271	1080	44	1294		192	218			215	
v/s Ratio Prot	0.00	0.40		c0.02	c0.45			0.00				
v/s Ratio Perm			0.04				c0.07				0.00	
v/c Ratio	0.24	0.59	0.06	0.75	0.65		0.52	0.02			0.03	
Uniform Delay, d1	37.8	6.5	4.1	37.4	6.5		30.9	28.8			28.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	5.8	0.7	0.0	51.4	1.1		2.5	0.0			0.1	
Delay (s)	43.6	7.2	4.1	88.8	7.6		33.4	28.8			28.8	
Level of Service	D	A	A	F	A		C	C			C	
Approach Delay (s)		7.0			10.7			32.3			28.8	
Approach LOS		A			B			C			C	

Intersection Summary			
HCM Average Control Delay	10.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	77.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — 2010 AM
21: Cypress Road & Empire Avenue — 11/6/2006

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↱		↰	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.96		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3388		1770	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	3388		1770	3539
Volume (vph)	150	170	250	100	90	270
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	167	189	278	111	100	300
RTOR Reduction (vph)	0	147	63	0	0	0
Lane Group Flow (vph)	167	42	326	0	100	300
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	10.0	10.0	18.6		5.2	27.8
Effective Green, g (s)	10.5	10.5	19.6		5.2	28.8
Actuated g/C Ratio	0.22	0.22	0.41		0.11	0.61
Clearance Time (s)	4.5	4.5	5.0		4.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	393	351	1404		195	2155
v/s Ratio Prot	c0.09		c0.10		c0.06	0.08
v/s Ratio Perm		0.03				
v/c Ratio	0.42	0.12	0.23		0.51	0.14
Uniform Delay, d1	15.8	14.7	9.0		19.9	4.0
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.7	0.2	0.1		2.3	0.0
Delay (s)	16.5	14.9	9.1		22.1	4.0
Level of Service	B	B	A		C	A
Approach Delay (s)	15.7		9.1			8.5
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	10.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	47.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	33.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — 2010 AM
22: Cypress Road & Main Street — 11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↱	↱	↰	↑↑	↱	↰↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	0.95	1.00	0.95	1.00	0.97	0.95	
Frt	1.00	0.95		1.00	0.94	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3361		1770	1668	1504	1770	3539	1583	3433	3525	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3361		1770	1668	1504	1770	3539	1583	3433	3525	
Volume (vph)	40	120	60	100	140	350	30	380	110	330	350	10
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	44	133	67	111	156	389	33	422	122	367	389	11
RTOR Reduction (vph)	0	52	0	0	30	214	0	0	90	0	2	0
Lane Group Flow (vph)	44	148	0	111	223	78	33	422	32	367	398	0
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			
Actuated Green, G (s)	1.9	13.1		4.6	15.8	15.8	1.6	15.7	15.7	9.7	23.8	
Effective Green, g (s)	1.9	13.1		4.6	15.8	15.8	1.6	15.7	15.7	9.7	23.8	
Actuated g/C Ratio	0.03	0.22		0.08	0.27	0.27	0.03	0.27	0.27	0.16	0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	57	745		138	446	402	48	940	421	563	1420	
v/s Ratio Prot	0.02	0.04		c0.06	c0.13		0.02	c0.12		c0.11	0.11	
v/s Ratio Perm						0.05			0.02			
v/c Ratio	0.77	0.20		0.80	0.50	0.19	0.69	0.45	0.08	0.65	0.28	
Uniform Delay, d1	28.4	18.7		26.8	18.3	16.7	28.5	18.1	16.3	23.1	11.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	46.8	0.1		27.7	0.9	0.2	33.8	0.3	0.1	2.7	0.1	
Delay (s)	75.2	18.9		54.5	19.2	17.0	62.3	18.4	16.3	25.8	12.0	
Level of Service	E	B		D	B	B	E	B	B	C	B	
Approach Delay (s)		29.0			24.2			20.5			18.6	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	21.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	59.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis — 2010 AM
23: Live Oak Ave & — 11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↑↱			↰↑↑↱			↰↑↱			↰↑↱	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	30	180	70	70	200	20	100	120	50	90	40	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	196	76	76	217	22	109	130	54	98	43	22

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	130	174	185	130	293	163
Volume Left (vph)	33	0	76	0	109	98
Volume Right (vph)	0	76	0	22	54	22
Hadj (s)	0.16	-0.27	0.24	-0.08	0.00	0.07
Departure Headway (s)	6.6	6.2	6.7	6.4	5.9	6.3
Degree Utilization, x	0.24	0.30	0.34	0.23	0.48	0.28
Capacity (veh/h)	503	540	503	528	566	517
Control Delay (s)	10.5	10.6	12.0	10.1	14.3	11.7
Approach Delay (s)	10.6		11.2		14.3	11.7
Approach LOS	B		B		B	B

Intersection Summary			
Delay	12.0		
HCM Level of Service	B		
Intersection Capacity Utilization	42.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis — 2010 AM
24: Laurel Road & Live Oak Ave — 11/6/2006

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰↰	↑↑↑	↑↑↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	0.91	0.91		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3433	5085	5030		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	3433	5085	5030		1770	1583
Volume (vph)	220	620	900	70	90	230
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	239	674	978	76	98	250
RTOR Reduction (vph)	0	0	11	0	0	202
Lane Group Flow (vph)	239	674	1043	0	98	48
Turn Type	Prot					Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	5.1	26.6	17.5		6.7	6.7
Effective Green, g (s)	5.1	27.6	18.5		7.7	7.7
Actuated g/C Ratio	0.12	0.64	0.43		0.18	0.18
Clearance Time (s)	4.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	404	3241	2149		315	282
v/s Ratio Prot	c0.07	0.13	c0.21		c0.06	
v/s Ratio Perm						0.03
v/c Ratio	0.59	0.21	0.49		0.31	0.17
Uniform Delay, d1	18.1	3.3	9.0		15.5	15.1
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	2.3	0.0	0.2		0.6	0.3
Delay (s)	20.4	3.3	9.1		16.1	15.4
Level of Service	C	A	A		B	B
Approach Delay (s)		7.8	9.1		15.6	
Approach LOS		A	A		B	

Intersection Summary			
HCM Average Control Delay	9.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	43.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	40.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.99		1.00	0.96		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3391		1770	3510		1770	3381		1770	3261	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3391		1770	3510		1770	3381		1770	3261	
Volume (vph)	170	390	150	50	690	40	60	70	30	50	200	220
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	189	433	167	56	767	44	67	78	33	56	222	244
RTOR Reduction (vph)	0	56	0	0	6	0	0	27	0	0	201	0
Lane Group Flow (vph)	189	544	0	56	805	0	67	84	0	56	265	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	8.0	21.6		3.2	16.8		2.1	9.1		2.1	9.1	
Effective Green, g (s)	8.0	21.6		3.2	16.8		2.1	9.1		2.1	9.1	
Actuated g/C Ratio	0.15	0.42		0.06	0.32		0.04	0.17		0.04	0.17	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	272	1409		109	1134		71	592		71	571	
v/s Ratio Prot	c0.11	0.16		0.03	c0.23		c0.04	0.02		0.03	c0.08	
v/s Ratio Perm												
v/c Ratio	0.69	0.39		0.51	0.71		0.94	0.14		0.79	0.46	
Uniform Delay, d1	20.8	10.6		23.6	15.5		24.9	18.1		24.7	19.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.5	0.2		4.0	2.1		86.8	0.1		42.6	0.6	
Delay (s)	28.3	10.8		27.7	17.5		111.7	18.3		67.3	19.9	
Level of Service	C	B		C	B		F	B		E	B	
Approach Delay (s)		15.0			18.2			53.4			25.0	
Approach LOS		B			B			D			C	

Intersection Summary			
HCM Average Control Delay	21.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	52.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

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CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 No Project                                      10/23/06
========================================================================
INTERSECTION     1 Minaker/Wilbur                    Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            20    5   10
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    20 ---  1.0   1.0  1.1  1.1   1.1 ---   10  RIGHT
                                                          STREET NAME:
THRU   100 ---> 2.1  (NO. OF LANES)   2.1<---  480  THRU  Wilbur

RIGHT   40 ---  1.1   1.1  1.1  1.0   1.0 ---   10  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 140    5   20                         Urb=N, Rur=N
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Minaker
========================================================================
               ORIGINAL   ADJUSTED                V/C    CRITICAL
   MOVEMENT     VOLUME     VOLUME*  CAPACITY   RATIO      V/C
------------------------------------------------------------------------
NB  RIGHT (R)      20         10 *     1650     0.0061
    THRU (T)        5          5       1650     0.0030
    LEFT (L)      140        140       1650     0.0848
    T + L                    145       1650     0.0879     0.0879
------------------------------------------------------------------------
SB  RIGHT (R)      20          0 *     1650     0.0000
    THRU (T)        5          5       1650     0.0030
    LEFT (L)       10         10       1650     0.0061     0.0061
    T + L                     15       1650     0.0091
------------------------------------------------------------------------
EB  RIGHT (R)      40         40       1650     0.0242
    THRU (T)      100        100       3300     0.0303
    LEFT (L)       20         20       1650     0.0121     0.0121
    T + R                    140       3300     0.0424
------------------------------------------------------------------------
WB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      480        480       3300     0.1455
    LEFT (L)       10         10       1650     0.0061
    T + R                    490       3300     0.1485     0.1485
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                           0.25
     INTERSECTION LEVEL OF SERVICE:                               A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_NP.INT,VOL=2010_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 No Project                                      10/23/06
========================================================================
INTERSECTION     6 Hillcrest/18th St                 Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------            40   70   40
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    10 ---  1.0   1.0  1.0  1.0   1.1 ---   30  RIGHT
                                                          STREET NAME:
THRU   140 ---> 2.1  (NO. OF LANES)   2.1<---  350  THRU  18th St

RIGHT   70 ---  1.1   1.0  1.0  1.0   1.0 ---  180  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 190  100  140                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Hillcrest
========================================================================
               ORIGINAL   ADJUSTED                V/C    CRITICAL
   MOVEMENT     VOLUME     VOLUME*  CAPACITY   RATIO      V/C
------------------------------------------------------------------------
NB  RIGHT (R)     140          0 *     1650     0.0000
    THRU (T)      100        100       1650     0.0606
    LEFT (L)      190        190       1650     0.1152     0.1152
------------------------------------------------------------------------
SB  RIGHT (R)      40         30 *     1650     0.0182
    THRU (T)       70         70       1650     0.0424     0.0424
    LEFT (L)       40         40       1650     0.0242
------------------------------------------------------------------------
EB  RIGHT (R)      70         70       1650     0.0424
    THRU (T)      140        140       3300     0.0424
    LEFT (L)       10         10       1650     0.0061
    T + R                    210       3300     0.0636     0.0636
------------------------------------------------------------------------
WB  RIGHT (R)      30         30       1650     0.0182
    THRU (T)      350        350       3300     0.1061
    LEFT (L)      180        180       1650     0.1091     0.1091
    T + R                    380       3300     0.1152
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                           0.33
     INTERSECTION LEVEL OF SERVICE:                               A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_NP.INT,VOL=2010_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 No Project                                      10/23/06
========================================================================
INTERSECTION     7 Viera/18th St                     Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       2-PHASE SIGNAL
-----------            50   20   10
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    70 ---  1.0   1.1  1.1  1.1   1.1 ---  130  RIGHT
                                                          STREET NAME:
THRU   190 ---> 2.0  (NO. OF LANES)   1.1<---  350  THRU  18th St

RIGHT   40 ---  1.0   1.1  1.1  1.0   1.0 ---   10  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 120   30   10                         Urb=N, Rur=N
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Viera
========================================================================
               ORIGINAL   ADJUSTED                V/C    CRITICAL
   MOVEMENT     VOLUME     VOLUME*  CAPACITY   RATIO      V/C
------------------------------------------------------------------------
NB  RIGHT (R)      10          0 *     1800     0.0000
    THRU (T)       30         30       1800     0.0167
    LEFT (L)      120        120       1800     0.0667     0.0667
    T + L                    150       1800     0.0833
------------------------------------------------------------------------
SB  RIGHT (R)      50         50       1800     0.0278
    THRU (T)       20         20       1800     0.0111
    LEFT (L)       10         10       1800     0.0056
    T + R                     70       1800     0.0389
    T + L                     30       1800     0.0167
    T + R + L                 80       1800     0.0444     0.0444
------------------------------------------------------------------------
EB  RIGHT (R)      40          0 *     1800     0.0000
    THRU (T)      190        190       3600     0.0528
    LEFT (L)       70         70       1800     0.0389     0.0389
------------------------------------------------------------------------
WB  RIGHT (R)     130        130       1800     0.0722
    THRU (T)      350        350       1800     0.1944
    LEFT (L)       10         10       1800     0.0056
    T + R                    480       1800     0.2667     0.2667
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                           0.42
     INTERSECTION LEVEL OF SERVICE:                               A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_NP.INT,VOL=2010_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 No Project                                      10/23/06
========================================================================
INTERSECTION     8 Phillips Lane/18th Street         Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------            30   10   20
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    40 ---  1.0   1.1  1.1  2.0   1.0 ---   30  RIGHT
                                                          STREET NAME:
THRU   210 ---> 2.1  (NO. OF LANES)   2.0<---  470  THRU  18th Street

RIGHT    5 ---  1.1   1.0  1.1  1.1   1.0 ---   10  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  10   10   10                         Urb=N, Rur=N
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Phillips Lane
========================================================================
               ORIGINAL   ADJUSTED                V/C    CRITICAL
   MOVEMENT     VOLUME     VOLUME*  CAPACITY   RATIO      V/C
------------------------------------------------------------------------
NB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)       10         10       1650     0.0061
    LEFT (L)       10         10       1650     0.0061
    T + R                     20       1650     0.0121     0.0121
------------------------------------------------------------------------
SB  RIGHT (R)      30         30       1650     0.0182
    THRU (T)       10         10       1650     0.0061
    LEFT (L)       20         20       3000     0.0067
    T + R                     40       1650     0.0242     0.0242
------------------------------------------------------------------------
EB  RIGHT (R)       5          5       1650     0.0030
    THRU (T)      210        210       3300     0.0636
    LEFT (L)       40         40       1650     0.0242     0.0242
    T + R                    215       3300     0.0652
------------------------------------------------------------------------
WB  RIGHT (R)      30         19 *     1650     0.0115
    THRU (T)      470        470       3300     0.1424     0.1424
    LEFT (L)       10         10       1650     0.0061
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                           0.20
     INTERSECTION LEVEL OF SERVICE:                               A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_NP.INT,VOL=2010_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 No Project                                      10/23/06
========================================================================
INTERSECTION     9 SR 160 SB Ramp/Main Street        Oakley
Count Date                   Time                 Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                           5-PHASE SIGNAL
-----------            20   20   30
                        |    |    |
            ^           |    |    |          ^
            |       <---    v   --->         | Split? N
LEFT    10 ---  1.0   1.1  1.1  1.0   1.0 ---   60  RIGHT
                                                          STREET NAME:
THRU   220 ---> 2.1  (NO. OF LANES)   2.0<---  430  THRU  Main Street

RIGHT   20 ---  1.1   1.0  1.1  1.1   2.0 ---  840  LEFT
            |       <---    ^   --->         |
            v           |    |    |          v
  N                     |    |    |                       SIG WARRANTS:
W + E                  30   10   60                         Urb=N, Rur=B
  S                   LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 SB Ramp
========================================================================
               ORIGINAL   ADJUSTED                 V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY     RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      60          60       1650      0.0364
    THRU (T)       10          10       1650      0.0061
    LEFT (L)       30          30       1650      0.0182
    T + R                      70       1650      0.0424     0.0424
------------------------------------------------------------------------
SB  RIGHT (R)      20          20       1650      0.0121
    THRU (T)       20          20       1650      0.0121
    LEFT (L)       30          30       1650      0.0182     0.0182
    T + R                      40       1650      0.0242
------------------------------------------------------------------------
EB  RIGHT (R)      20          20       1650      0.0121
    THRU (T)      220         220       3300      0.0667
    LEFT (L)       10          10       1650      0.0061
    T + R                     240       3300      0.0727     0.0727
------------------------------------------------------------------------
WB  RIGHT (R)      60          30 *     1650      0.0182
    THRU (T)      430         430       3300      0.1303
    LEFT (L)      840         840       3000      0.2800     0.2800
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                           0.41
     INTERSECTION LEVEL OF SERVICE:                               A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_NP.INT,VOL=2010_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 No Project                                      10/23/06
========================================================================
INTERSECTION    10 SR 160 NB Ramp/Main Street        Oakley
Count Date                   Time                 Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                           3-PHASE SIGNAL
-----------             0    0    0
                        |    |    |
            ^           |    |    |          ^
            |       <---    v   --->         | Split? N
LEFT     0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  RIGHT
                                                          STREET NAME:
THRU   270 ---> 2.1  (NO. OF LANES)   2.0<--- 1240  THRU  Main Street

RIGHT   40 ---  1.1   1.0  0.0  2.5   1.0 ---   60  LEFT
            |       <---    ^   --->         |
            v           |    |    |          v
  N                     |    |    |                       SIG WARRANTS:
W + E                  90    0  580                         Urb=Y, Rur=Y
  S                   LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 NB Ramp
========================================================================
               ORIGINAL   ADJUSTED                 V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY     RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     580         471 *     3127      0.1506     0.1506
    LEFT (L)       90          90       1720      0.0523
------------------------------------------------------------------------
EB  RIGHT (R)      40          40       1720      0.0233
    THRU (T)      270         270       3440      0.0785
    T + R                     310       3440      0.0901
------------------------------------------------------------------------
WB  THRU (T)     1240        1240       3440      0.3605     0.3605
    LEFT (L)       60          60       1720      0.0349
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                           0.51
     INTERSECTION LEVEL OF SERVICE:                               A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_NP.INT,VOL=2010_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 No Project                                      10/23/06
========================================================================
INTERSECTION    11 Neroly/Main Street                Oakley
Count Date                   Time                 Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                           6-PHASE SIGNAL
-----------            80   50  100
                        |    |    |
            ^           |    |    |          ^
            |       <---    v   --->         | Split? N
LEFT    60 ---  1.0   1.0  1.1  2.1   1.0 ---  330  RIGHT
                                                          STREET NAME:
THRU   600 ---> 2.1  (NO. OF LANES)   3.0<--- 1020  THRU  Main Street

RIGHT  190 ---  1.1   2.0  1.1  1.1   1.0 ---   10  LEFT
            |       <---    ^   --->         |
            v           |    |    |          v
  N                     |    |    |                       SIG WARRANTS:
W + E                 200  110   50                         Urb=Y, Rur=Y
  S                   LEFT THRU RIGHT Split? Y

               STREET NAME: Neroly
========================================================================
               ORIGINAL   ADJUSTED                 V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY     RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      50          50       1650      0.0303
    THRU (T)      110         110       1650      0.0667
    LEFT (L)      200         200       3000      0.0667
    T + R                     160       1650      0.0970     0.0970
------------------------------------------------------------------------
SB  RIGHT (R)      80          20 *     1650      0.0121
    THRU (T)       50          50       1650      0.0303
    LEFT (L)      100         100       3000      0.0333
    T + L                     150       3000      0.0500     0.0500
------------------------------------------------------------------------
EB  RIGHT (R)     190         190       1650      0.1152
    THRU (T)      600         600       3300      0.1818
    LEFT (L)       60          60       1650      0.0364
    T + R                     790       3300      0.2394     0.2394
------------------------------------------------------------------------
WB  RIGHT (R)     330         275 *     1650      0.1667
    THRU (T)     1020        1020       4950      0.2061
    LEFT (L)       10          10       1650      0.0061     0.0061
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                           0.39
     INTERSECTION LEVEL OF SERVICE:                               A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_NP.INT,VOL=2010_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 No Project                                      10/23/06
========================================================================
INTERSECTION    13 Live Oak/Main Street              Oakley
Count Date                   Time                 Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                           3-PHASE SIGNAL
-----------             0    0    0
                        |    |    |
            ^           |    |    |          ^
            |       <---    v   --->         | Split? N
LEFT     0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  RIGHT
                                                          STREET NAME:
THRU   710 ---> 2.1  (NO. OF LANES)   2.0<--- 1270  THRU  Main Street

RIGHT   40 ---  1.1   1.0  0.0  1.0   1.0 ---   30  LEFT
            |       <---    ^   --->         |
            v           |    |    |          v
  N                     |    |    |                       SIG WARRANTS:
W + E                  90    0   30                         Urb=N, Rur=Y
  S                   LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
========================================================================
               ORIGINAL   ADJUSTED                 V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY     RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      30           0 *     1720      0.0000
    LEFT (L)       90          90       1720      0.0523     0.0523
------------------------------------------------------------------------
EB  RIGHT (R)      40          40       1720      0.0233
    THRU (T)      710         710       3440      0.2064
    T + R                     750       3440      0.2180
------------------------------------------------------------------------
WB  THRU (T)     1270        1270       3440      0.3692     0.3692
    LEFT (L)       30          30       1720      0.0174
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                           0.42
     INTERSECTION LEVEL OF SERVICE:                               A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_NP.INT,VOL=2010_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 No Project                                      10/23/06
========================================================================
INTERSECTION    14 Big Break/Main Street             Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------           200   40   60
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    70 ---  1.0   1.0  1.1  1.1   1.0 ---   60  RIGHT
                                                          STREET NAME:
THRU   650 ---> 2.0  (NO. OF LANES)   2.0<--- 1010  THRU  Main Street

RIGHT   30 ---  1.0   1.0  1.1  1.1   1.0 ---   50  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  60   20   30                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Big Break
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      30         30       1650     0.0182
    THRU (T)       20         20       1650     0.0121
    LEFT (L)       60         60       1650     0.0364     0.0364
    T + R                     50       1650     0.0303
------------------------------------------------------------------------
SB  RIGHT (R)     200        130 *     1650     0.0788     0.0788
    THRU (T)       40         40       1650     0.0242
    LEFT (L)       60         60       1650     0.0364
    T + L                    100       1650     0.0606
------------------------------------------------------------------------
EB  RIGHT (R)      30          0 *     1650     0.0000
    THRU (T)      650        650       3300     0.1970
    LEFT (L)       70         70       1650     0.0424     0.0424
------------------------------------------------------------------------
WB  RIGHT (R)      60          0 *     1650     0.0000
    THRU (T)     1010       1010       3300     0.3061     0.3061
    LEFT (L)       50         50       1650     0.0303
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.46
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_NP.INT,VOL=2010_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 No Project                                      10/23/06
========================================================================
INTERSECTION    17 Empire Ave/Oakley Road            Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------            60  210   40
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? Y
LEFT    60 ---  2.1   1.0  1.0  1.0   1.0 ---   20  RIGHT
                                                          STREET NAME:
THRU    10 ---> 1.1  (NO. OF LANES)   1.1<---   10  THRU  Oakley Road

RIGHT  110 ---  1.0   1.0  2.1  1.1   1.1 ---   20  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 170  280   10                         Urb=N, Rur=N
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire Ave
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      280        280       3300     0.0848
    LEFT (L)      170        170       1650     0.1030     0.1030
    T + R                    290       3300     0.0879
------------------------------------------------------------------------
SB  RIGHT (R)      60         27 *     1650     0.0164
    THRU (T)      210        210       1650     0.1273     0.1273
    LEFT (L)       40         40       1650     0.0242
------------------------------------------------------------------------
EB  RIGHT (R)     110          0 *     1650     0.0000
    THRU (T)       10         10       1650     0.0061
    LEFT (L)       60         60       3000     0.0200
    T + L                     70       3000     0.0233     0.0233
------------------------------------------------------------------------
WB  RIGHT (R)      20          0 *     1650     0.0000
    THRU (T)       10         10       1650     0.0061
    LEFT (L)       20         20       1650     0.0121
    T + L                     30       1650     0.0182     0.0182
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.27
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_NP.INT,VOL=2010_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 No Project                                      10/23/06
========================================================================
INTERSECTION    18 Empire Avenue/Main Street         Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------            40   50   20
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    20 ---  1.0   1.0  1.1  1.1   1.1 ---   10  RIGHT
                                                          STREET NAME:
THRU   600 ---> 2.0  (NO. OF LANES)   2.1<---  780  THRU  Main Street

RIGHT  130 ---  1.0   2.0  1.0  1.0   1.0 ---  130  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 250   10  100                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Empire Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     100          0 *     1650     0.0000
    THRU (T)       10         10       1650     0.0061
    LEFT (L)      250        250       3000     0.0833     0.0833
------------------------------------------------------------------------
SB  RIGHT (R)      40         20 *     1650     0.0121
    THRU (T)       50         50       1650     0.0303
    LEFT (L)       20         20       1650     0.0121
    T + L                     70       1650     0.0424     0.0424
------------------------------------------------------------------------
EB  RIGHT (R)     130          0 *     1650     0.0000
    THRU (T)      600        600       3300     0.1818     0.1818
    LEFT (L)       20         20       1650     0.0121
------------------------------------------------------------------------
WB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      780        780       3300     0.2364
    LEFT (L)      130        130       1650     0.0788     0.0788
    T + R                    790       3300     0.2394
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.39
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_NP.INT,VOL=2010_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 No Project                                      10/23/06
========================================================================
INTERSECTION    19 Vintage/Main Street               Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------           150    0  180
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    70 ---  1.0   1.0  0.0  1.0   1.1 ---  100  RIGHT
                                                          STREET NAME:
THRU   630 ---> 2.0  (NO. OF LANES)   2.1<---  750  THRU  Main Street

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Vintage
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)     150         80 *     1720     0.0465
    LEFT (L)      180        180       1720     0.1047     0.1047
------------------------------------------------------------------------
EB  THRU (T)      630        630       3440     0.1831
    LEFT (L)       70         70       1720     0.0407     0.0407
------------------------------------------------------------------------
WB  RIGHT (R)     100        100       1720     0.0581
    THRU (T)      750        750       3440     0.2180
    T + R                    850       3440     0.2471     0.2471
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.39
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_NP.INT,VOL=2010_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 No Project                                      10/23/06
========================================================================
INTERSECTION    20 O'Hara Avenue/Main Street         Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------             5    0    5
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     5 ---  1.0   1.1  1.1  1.1   1.1 ---    5  RIGHT
                                                          STREET NAME:
THRU   670 ---> 1.0  (NO. OF LANES)   1.1<---  750  THRU  Main Street

RIGHT   90 ---  1.0   1.0  1.1  1.1   1.0 ---   30  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  90    0   30                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: O'Hara Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      30         30       1650     0.0182
    THRU (T)        0          0       1650     0.0000
    LEFT (L)       90         90       1650     0.0545     0.0545
    T + R                     30       1650     0.0182
------------------------------------------------------------------------
SB  RIGHT (R)       5          5       1650     0.0030
    THRU (T)        0          0       1650     0.0000
    LEFT (L)        5          5       1650     0.0030
    T + R                      5       1650     0.0030
    T + L                      5       1650     0.0030
    T + R + L                 10       1650     0.0061     0.0061
------------------------------------------------------------------------
EB  RIGHT (R)      90          0 *     1650     0.0000
    THRU (T)      670        670       1650     0.4061
    LEFT (L)        5          5       1650     0.0030     0.0030
------------------------------------------------------------------------
WB  RIGHT (R)       5          5       1650     0.0030
    THRU (T)      750        750       1650     0.4545
    LEFT (L)       30         30       1650     0.0182
    T + R                    755       1650     0.4576     0.4576
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.52
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_NP.INT,VOL=2010_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 No Project                                      10/23/06
========================================================================
INTERSECTION    21 Empire Avenue/Cypress Road        Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0  270   90
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  2.0  1.0   1.0 ---  170  RIGHT
                                                          STREET NAME:
THRU     0 ---> 0.0  (NO. OF LANES)   0.0<---    0  THRU  Cypress Road

RIGHT    0 ---  0.0   0.0  2.1  1.1   1.0 ---  150  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0  250  100                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     100        100       1720     0.0581
    THRU (T)      250        250       3440     0.0727
    T + R                    350       3440     0.1017     0.1017
------------------------------------------------------------------------
SB  THRU (T)      270        270       3440     0.0785
    LEFT (L)       90         90       1720     0.0523     0.0523
------------------------------------------------------------------------
WB  RIGHT (R)     170         80 *     1720     0.0465
    LEFT (L)      150        150       1720     0.0872     0.0872
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.24
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_NP.INT,VOL=2010_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 No Project                                      10/23/06
========================================================================
INTERSECTION    22 Main Street/Cypress               Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            10  350  330
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    40 ---  1.0   1.1  2.1  2.0   2.1 ---  350  RIGHT
                                                          STREET NAME:
THRU   120 ---> 2.1  (NO. OF LANES)   1.1<---  140  THRU  Cypress

RIGHT   60 ---  1.1   1.0  2.0  1.0   1.0 ---  100  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  30  380  110                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Main Street
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     110         10 *     1650     0.0061
    THRU (T)      380        380       3300     0.1152     0.1152
    LEFT (L)       30         30       1650     0.0182
------------------------------------------------------------------------
SB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      350        350       3300     0.1061
    LEFT (L)      330        330       3000     0.1100     0.1100
    T + R                    360       3300     0.1091
------------------------------------------------------------------------
EB  RIGHT (R)      60         60       1650     0.0364
    THRU (T)      120        120       3300     0.0364
    LEFT (L)       40         40       1650     0.0242     0.0242
    T + R                    180       3300     0.0545
------------------------------------------------------------------------
WB  RIGHT (R)     350        169 *     3000     0.0563
    THRU (T)      140        140       1650     0.0848
    LEFT (L)      100        100       1650     0.0606
    T + R                    309       3000     0.1030     0.1030
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.35
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_NP.INT,VOL=2010_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 No Project                                      10/23/06
========================================================================
INTERSECTION    24 Live Oak/Laurel                   Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------           230    0   90
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   220 ---  2.0   1.0  0.0  1.0   1.1 ---   70  RIGHT
                                                          STREET NAME:
THRU   620 ---> 3.0  (NO. OF LANES)   3.1<---  900  THRU  Laurel

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)     230        109 *     1720     0.0634     0.0634
    LEFT (L)       90         90       1720     0.0523
------------------------------------------------------------------------
EB  THRU (T)      620        620       5160     0.1202
    LEFT (L)      220        220       3127     0.0704     0.0704
------------------------------------------------------------------------
WB  RIGHT (R)      70         70       1720     0.0407
    THRU (T)      900        900       5160     0.1744
    T + R                    970       5160     0.1880     0.1880
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.32
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_NP.INT,VOL=2010_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 No Project                                      10/23/06
========================================================================
INTERSECTION    25 Empire/Laurel                     Oakley
Count Date                    Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                         8-PHASE SIGNAL
-----------           220  200   50
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   170 ---  1.0   1.1  2.1  1.0   1.1 ---   40  RIGHT
                                                          STREET NAME:
THRU   390 ---> 2.1  (NO. OF LANES)   2.1<---  690  THRU  Laurel

RIGHT  150 ---  1.1   1.0  2.1  1.1   1.0 ---   50  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  60   70   30                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire
========================================================================
               ORIGINAL   ADJUSTED               V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*  CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      30         30       1650     0.0182
    THRU (T)       70         70       3300     0.0212
    LEFT (L)       60         60       1650     0.0364     0.0364
    T + R                    100       3300     0.0303
------------------------------------------------------------------------
SB  RIGHT (R)     220        220       1650     0.1333     0.1333
    THRU (T)      200        200       3300     0.0606
    LEFT (L)       50         50       1650     0.0303
    T + R                    420       3300     0.1273
------------------------------------------------------------------------
EB  RIGHT (R)     150        150       1650     0.0909
    THRU (T)      390        390       3300     0.1182
    LEFT (L)      170        170       1650     0.1030     0.1030
    T + R                    540       3300     0.1636
------------------------------------------------------------------------
WB  RIGHT (R)      40         40       1650     0.0242
    THRU (T)      690        690       3300     0.2091
    LEFT (L)       50         50       1650     0.0303
    T + R                    730       3300     0.2212     0.2212
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                           0.49
     INTERSECTION LEVEL OF SERVICE:                               A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_NP.INT,VOL=2010_NP.AM,CAP=
```

Near Term (2010) No Project PM

HCM Signalized Intersection Capacity Analysis
1: Wilbur Avenue & Minaker Drive

2010 PM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↰↑	↱		↰↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	0.96		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (prot)	1770	3382		1770	3512			1770	1583		1817	1583
Flt Permitted	0.95	1.00		0.95	1.00			0.74	1.00		0.81	1.00
Satd. Flow (perm)	1770	3382		1770	3512			1384	1583		1508	1583
Volume (vph)	10	380	160	30	180	10	60	0	40	10	10	20
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	11	422	178	33	200	11	67	0	44	11	11	22
RTOR Reduction (vph)	0	40	0	0	3	0	0	0	40	0	0	20
Lane Group Flow (vph)	11	560	0	33	208	0	0	67	4	0	22	2
Turn Type	Prot			Prot			Perm		Perm	Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		4
Actuated Green, G (s)	1.5	36.8		1.8	37.1			5.4	5.4		5.4	5.4
Effective Green, g (s)	1.5	36.8		1.8	37.1			5.4	5.4		5.4	5.4
Actuated g/C Ratio	0.03	0.66		0.03	0.66			0.10	0.10		0.10	0.10
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	47	2222		57	2327			133	153		145	153
v/s Ratio Prot	0.01	c0.17		c0.02	0.06							
v/s Ratio Perm								c0.05	0.00		0.01	0.00
v/c Ratio	0.23	0.25		0.58	0.09			0.50	0.03		0.15	0.01
Uniform Delay, d1	26.7	3.9		26.7	3.4			24.0	22.9		23.2	22.9
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	2.6	0.1		13.5	0.0			3.0	0.1		0.5	0.0
Delay (s)	29.2	4.0		40.2	3.4			27.0	23.0		23.7	22.9
Level of Service	C	A		D	A			C	C		C	C
Approach Delay (s)		4.5			8.4			25.4			23.3	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	8.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	56.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	38.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
2: Wilbur Avenue & Viera Avenue

2010 PM
11/6/2006

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱		↰	↑	Y	
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	370	120	10	160	40	10
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	385	125	10	167	42	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			510		635	448
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			510		635	448
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		90	98
cM capacity (veh/h)			1055		438	611

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	510	10	167	52
Volume Left	0	10	0	42
Volume Right	125	0	0	10
cSH	1700	1055	1700	464
Volume to Capacity	0.30	0.01	0.10	0.11
Queue Length 95th (ft)	0	1	0	9
Control Delay (s)	0.0	8.4	0.0	13.7
Lane LOS		A		B
Approach Delay (s)	0.0	0.5		13.7
Approach LOS				B

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	36.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
3: Wilbur Avenue & SR 160 SB Off

2010 PM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱		↰	↑↑					↰		↱
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	420	90	30	110	0	0	0	0	170	0	60
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	467	100	33	122	0	0	0	0	189	0	67
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	122			567			644	706	517	706	756	61
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	122			567			644	706	517	706	756	61
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			100	100	100	40	100	93
cM capacity (veh/h)	1463			1001			325	347	503	315	325	991

Direction, Lane #	EB 1	WB 1	WB 2	WB 3	SB 1	SB 2
Volume Total	567	33	61	61	189	67
Volume Left	0	33	0	0	189	0
Volume Right	100	0	0	0	0	67
cSH	1700	1001	1700	1700	315	991
Volume to Capacity	0.33	0.03	0.04	0.04	0.60	0.07
Queue Length 95th (ft)	0	3	0	0	91	5
Control Delay (s)	0.0	8.7	0.0	0.0	32.2	8.9
Lane LOS		A			D	A
Approach Delay (s)	0.0	1.9			26.1	
Approach LOS					D	

Intersection Summary			
Average Delay	7.1		
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
4: Wilbur Avenue & SR 160 NB On

2010 PM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑			↑↱		↰		↱			
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	260	330	0	0	130	100	10	0	20	0	0	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	289	367	0	0	144	111	11	0	22	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	256			367			1017	1200	183	961	1144	128
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	256			367			1017	1200	183	961	1144	128
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	78			100			93	100	97	100	100	100
cM capacity (veh/h)	1306			1188			159	143	828	170	155	899

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2
Volume Total	289	183	183	96	159	11	22
Volume Left	289	0	0	0	0	11	0
Volume Right	0	0	0	0	111	0	22
cSH	1306	1700	1700	1700	1700	159	828
Volume to Capacity	0.22	0.11	0.11	0.06	0.09	0.07	0.03
Queue Length 95th (ft)	21	0	0	0	0	6	2
Control Delay (s)	8.5	0.0	0.0	0.0	0.0	29.3	9.5
Lane LOS	A					D	A
Approach Delay (s)	3.8			0.0		16.1	
Approach LOS						C	

Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
5: Wilbur Avenue & Bridgehead Road

2010 PM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	30	0	320	0	0	0	180	40	0	0	30	50
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	0	337	0	0	0	189	42	0	0	32	53

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1
Volume Total (vph)	32	337	0	232	84
Volume Left (vph)	32	0	0	189	0
Volume Right (vph)	0	337	0	0	53
Hadj (s)	0.53	-0.67	0.00	0.20	-0.34
Departure Headway (s)	5.9	4.6	5.3	5.1	4.8
Degree Utilization, x	0.05	0.43	0.00	0.33	0.11
Capacity (veh/h)	585	742	624	670	688
Control Delay (s)	8.0	10.0	8.3	10.5	8.4
Approach Delay (s)	9.8		0.0	10.5	8.4
Approach LOS	A		A	B	A

Intersection Summary			
Delay	9.9		
HCM Level of Service	A		
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
6: E 18th Street & Hillcrest Avenue

2010 PM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑	↗	↰	↑	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3348		1770	3489		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3348		1770	3489		1770	1863	1583	1770	1863	1583
Volume (vph)	40	410	230	330	390	40	170	150	270	60	120	30
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	42	427	240	344	406	42	177	156	281	62	125	31
RTOR Reduction (vph)	0	72	0	0	7	0	0	0	199	0	0	27
Lane Group Flow (vph)	42	595	0	344	441	0	177	156	82	62	125	4
Turn Type	Prot			Prot			Split		Perm	Split		Perm
Protected Phases	1	6		5	2		8	8		4	4	
Permitted Phases									8			4
Actuated Green, G (s)	2.5	19.4		18.7	35.6		13.0	13.0	13.0	8.5	8.5	8.5
Effective Green, g (s)	3.5	21.4		19.7	37.6		14.5	14.5	14.5	10.0	10.0	10.0
Actuated g/C Ratio	0.05	0.28		0.25	0.48		0.19	0.19	0.19	0.13	0.13	0.13
Clearance Time (s)	4.0	5.0		4.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	80	923		449	1691		331	348	296	228	240	204
v/s Ratio Prot	0.02	c0.18		c0.19	0.13		c0.10	0.08		0.04	c0.07	
v/s Ratio Perm									0.05			0.00
v/c Ratio	0.53	0.64		0.77	0.26		0.53	0.45	0.28	0.27	0.52	0.02
Uniform Delay, d1	36.2	24.7		26.8	11.8		28.5	28.0	27.1	30.5	31.6	29.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.1	1.6		7.6	0.1		1.7	0.9	0.5	0.6	2.0	0.0
Delay (s)	42.3	26.3		34.5	11.9		30.2	28.9	27.6	31.2	33.6	29.6
Level of Service	D	C		C	B		C	C	C	C	C	C
Approach Delay (s)		27.2			21.7			28.7			32.3	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	26.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	77.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
7: E 18th Street & Viera Avenue

2010 PM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↗	↰	↱			⬑	↗		✥	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	0.99			1.00	0.85		0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00		0.98	
Satd. Flow (prot)	1770	3539	1583	1770	1852			1783	1583		1742	
Flt Permitted	0.37	1.00	1.00	0.41	1.00			0.64	1.00		0.87	
Satd. Flow (perm)	692	3539	1583	764	1852			1192	1583		1542	
Volume (vph)	60	580	110	10	520	20	90	10	20	60	60	70
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	63	611	116	11	547	21	95	11	21	63	63	74
RTOR Reduction (vph)	0	0	44	0	2	0	0	0	16	0	43	0
Lane Group Flow (vph)	63	611	72	11	566	0	0	106	5	0	157	0
Turn Type	Perm		Perm	Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	25.0	25.0	25.0	25.0	25.0			8.8	8.8		8.8	
Effective Green, g (s)	27.0	27.0	27.0	27.0	27.0			10.8	10.8		10.8	
Actuated g/C Ratio	0.62	0.62	0.62	0.62	0.62			0.25	0.25		0.25	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	427	2182	976	471	1142			294	390		380	
v/s Ratio Prot		0.17			c0.31							
v/s Ratio Perm	0.09		0.05	0.01				0.09	0.00		c0.10	
v/c Ratio	0.15	0.28	0.07	0.02	0.50			0.36	0.01		0.41	
Uniform Delay, d1	3.5	3.9	3.4	3.3	4.6			13.6	12.5		13.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.2	0.1	0.0	0.0	0.3			0.8	0.0		0.7	
Delay (s)	3.7	4.0	3.4	3.3	5.0			14.4	12.5		14.6	
Level of Service	A	A	A	A	A			B	B		B	
Approach Delay (s)		3.9			4.9			14.1			14.6	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	6.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	43.8	Sum of lost time (s)	6.0
Intersection Capacity Utilization	59.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: E 18th Street & Phillips Lane

2010 PM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↗	↰	↱		↰↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.97	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.90		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3529		1770	3539	1583	1770	1682		3433	1600	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3529		1770	3539	1583	1770	1682		3433	1600	
Volume (vph)	140	490	10	10	360	120	10	10	20	130	10	160
Peak-hour factor, PHF	0.92	0.98	0.98	0.98	0.98	0.92	0.98	0.92	0.98	0.92	0.92	0.92
Adj. Flow (vph)	152	500	10	10	367	130	10	11	20	141	11	174
RTOR Reduction (vph)	0	1	0	0	0	95	0	18	0	0	148	0
Lane Group Flow (vph)	152	509	0	10	367	35	10	13	0	141	37	0
Turn Type	Prot			Prot		Perm	Split			Split		
Protected Phases	5	2		1	6		7	7		3	3	
Permitted Phases						6						
Actuated Green, G (s)	7.1	20.1		0.7	13.7	13.7	6.2	6.2		7.5	7.5	
Effective Green, g (s)	7.1	20.1		0.7	13.7	13.7	6.2	6.2		7.5	7.5	
Actuated g/C Ratio	0.14	0.40		0.01	0.27	0.27	0.12	0.12		0.15	0.15	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	249	1405		25	960	429	217	207		510	238	
v/s Ratio Prot	c0.09	c0.14		0.01	0.10		0.01	c0.01		c0.04	0.02	
v/s Ratio Perm						0.02						
v/c Ratio	0.61	0.36		0.40	0.38	0.08	0.05	0.07		0.28	0.15	
Uniform Delay, d1	20.4	10.7		24.7	15.0	13.7	19.5	19.6		19.1	18.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.4	0.2		10.2	0.3	0.1	0.1	0.1		0.3	0.3	
Delay (s)	24.8	10.9		34.9	15.2	13.8	19.6	19.7		19.4	19.0	
Level of Service	C	B		C	B	B	B	B		B	B	
Approach Delay (s)		14.0			15.2			19.7			19.2	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	15.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	50.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	38.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

9: E 18th Street & SR 160 SB Off

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰↰	↑↑	↱	↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.87		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3390		3335	3438	1538	1719	1577		1719	1700	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.72	1.00		0.38	1.00	
Satd. Flow (perm)	1719	3390		3335	3438	1538	1308	1577		684	1700	
Volume (vph)	30	580	60	400	410	100	40	20	120	80	30	20
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	31	604	62	417	427	104	42	21	125	83	31	21
RTOR Reduction (vph)	0	5	0	0	0	26	0	112	0	0	19	0
Lane Group Flow (vph)	31	661	0	417	427	78	42	34	0	83	33	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases						6	8			4		
Actuated Green, G (s)	5.2	60.7		33.6	89.1	89.1	12.7	12.7		12.7	12.7	
Effective Green, g (s)	5.2	61.7		33.6	90.1	90.1	12.7	12.7		12.7	12.7	
Actuated g/C Ratio	0.04	0.51		0.28	0.75	0.75	0.11	0.11		0.11	0.11	
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	4.0	4.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	74	1743		934	2581	1155	138	167		72	180	
v/s Ratio Prot	0.02	c0.20		c0.13	0.12			0.02			0.02	
v/s Ratio Perm						0.05	0.03			c0.12		
v/c Ratio	0.42	0.38		0.45	0.17	0.07	0.30	0.20		1.15	0.18	
Uniform Delay, d1	55.9	17.6		35.5	4.3	3.9	49.6	49.0		53.6	48.9	
Progression Factor	1.00	1.00		0.80	0.62	0.06	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.8	0.6		0.3	0.1	0.1	0.5	0.2		153.3	0.2	
Delay (s)	59.7	18.2		28.9	2.8	0.4	50.0	49.3		207.0	49.1	
Level of Service	E	B		C	A	A	D	D		F	D	
Approach Delay (s)		20.1			14.0			49.4			146.2	
Approach LOS		C			B			D			F	

Intersection Summary			
HCM Average Control Delay	28.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

10: Main Street & SR 160 NB On

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↱		↰	↑↑	↰	↱↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	1.00	0.88
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3405		1719	3438	1719	2707
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3405		1719	3438	1719	2707
Volume (vph)	730	50	60	820	90	1160
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	760	52	62	854	94	1208
RTOR Reduction (vph)	4	0	0	0	0	39
Lane Group Flow (vph)	808	0	62	854	94	1169
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Turn Type			Prot			pm+ov
Protected Phases	2		1	6	8	1
Permitted Phases						8
Actuated Green, G (s)	42.8		53.0	99.8	11.2	64.2
Effective Green, g (s)	43.8		53.0	100.8	11.2	64.2
Actuated g/C Ratio	0.36		0.44	0.84	0.09	0.54
Clearance Time (s)	5.0		4.0	5.0	4.0	4.0
Vehicle Extension (s)	4.0		3.0	4.0	2.0	3.0
Lane Grp Cap (vph)	1243		759	2888	160	1538
v/s Ratio Prot	c0.24		0.04	0.25	0.05	c0.34
v/s Ratio Perm						0.10
v/c Ratio	0.65		0.08	0.30	0.59	0.76
Uniform Delay, d1	31.7		19.4	2.0	52.2	21.9
Progression Factor	0.67		0.88	0.37	1.00	1.00
Incremental Delay, d2	2.5		0.0	0.3	3.5	2.3
Delay (s)	23.7		17.2	1.0	55.7	24.1
Level of Service	C		B	A	E	C
Approach Delay (s)	23.7			2.1	26.4	
Approach LOS	C			A	C	

Intersection Summary			
HCM Average Control Delay	18.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

11: Main Street & Bridgehead Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑↑	↱	↰↰	↱		↰	↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.91	1.00	0.97	1.00		0.95	0.95	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (prot)	1719	3326		1719	4940	1538	3335	1708		1633	1678	1538
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00
Satd. Flow (perm)	1719	3326		1719	4940	1538	3335	1708		1633	1678	1538
Volume (vph)	90	1410	390	30	590	150	220	100	60	250	90	70
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	92	1439	398	31	602	153	224	102	61	255	92	71
RTOR Reduction (vph)	0	18	0	0	0	69	0	19	0	0	0	63
Lane Group Flow (vph)	92	1819	0	31	602	84	224	144	0	169	178	8
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot		Perm	Split			Split		Perm
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases						6						7
Actuated Green, G (s)	11.3	72.8		3.6	65.1	65.1	13.6	13.6		13.0	13.0	13.0
Effective Green, g (s)	11.3	73.8		3.6	66.1	66.1	13.6	13.6		13.0	13.0	13.0
Actuated g/C Ratio	0.09	0.61		0.03	0.55	0.55	0.11	0.11		0.11	0.11	0.11
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	162	2045		52	2721	847	378	194		177	182	167
v/s Ratio Prot	0.05	c0.55		c0.02	0.12		0.07	c0.08		0.10	c0.11	
v/s Ratio Perm						0.05						0.01
v/c Ratio	0.57	0.89		0.60	0.22	0.10	0.59	0.74		0.95	0.98	0.05
Uniform Delay, d1	52.0	19.6		57.5	13.8	12.8	50.6	51.5		53.2	53.4	47.9
Progression Factor	0.95	1.06		0.98	0.91	0.63	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.8	4.4		11.5	0.2	0.2	1.7	12.6		53.7	59.4	0.0
Delay (s)	51.1	25.3		68.0	12.7	8.3	52.2	64.2		106.9	112.8	48.0
Level of Service	D	C		E	B	A	D	E		F	F	D
Approach Delay (s)		26.5			14.0			57.3			99.4	
Approach LOS		C			B			E			F	

Intersection Summary			
HCM Average Control Delay	35.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	88.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

12: Main Street & Sandy Lane

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↱		↰	↑↑	↰↱	
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	1710	10	10	760	10	10
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	1781	10	10	792	10	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL		
Median storage veh)					0	
Upstream signal (ft)	1017					
pX, platoon unblocked			0.56		0.56	0.56
vC, conflicting volume			1792		2203	896
vC1, stage 1 conf vol					1786	
vC2, stage 2 conf vol					417	
vCu, unblocked vol			1631		2360	45
tC, single (s)			4.2		6.9	7.0
tC, 2 stage (s)					5.9	
tF (s)			2.2		3.5	3.3
p0 queue free %			95		79	98
cM capacity (veh/h)			215		50	568

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	1188	604	10	396	396	21
Volume Left	0	0	10	0	0	10
Volume Right	0	10	0	0	0	10
cSH	1700	1700	215	1700	1700	92
Volume to Capacity	0.70	0.36	0.05	0.23	0.23	0.23
Queue Length 95th (ft)	0	0	4	0	0	20
Control Delay (s)	0.0	0.0	22.6	0.0	0.0	55.0
Lane LOS			C			F
Approach Delay (s)	0.0		0.3			55.0
Approach LOS						F

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	57.6%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
13: Main Street & Live Oak Ave

2010 PM
11/6/2006

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↱		↰	↑↑	↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3417		1719	3438	1719	1538
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3417		1719	3438	1719	1538
Volume (vph)	1650	70	20	720	50	40
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1701	72	21	742	52	41
RTOR Reduction (vph)	1	0	0	0	0	38
Lane Group Flow (vph)	1772	0	21	742	52	3
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Turn Type			Prot			custom
Protected Phases	2		1	6		
Permitted Phases					8	8
Actuated Green, G (s)	96.0		3.2	103.2	8.8	8.8
Effective Green, g (s)	96.0		3.2	103.2	8.8	8.8
Actuated g/C Ratio	0.80		0.03	0.86	0.07	0.07
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2734		46	2957	126	113
v/s Ratio Prot	c0.52		c0.01	0.22		
v/s Ratio Perm					c0.03	0.00
v/c Ratio	0.65		0.46	0.25	0.41	0.03
Uniform Delay, d1	5.0		57.5	1.5	53.1	51.6
Progression Factor	0.09		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7		7.0	0.2	2.2	0.1
Delay (s)	1.1		64.6	1.7	55.3	51.7
Level of Service	A		E	A	E	D
Approach Delay (s)	1.1			3.4	53.7	
Approach LOS	A			A	D	

Intersection Summary			
HCM Average Control Delay	3.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
14: Main Street & Big Break Road

2010 PM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↱			↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.98	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1647			1765	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.63	1.00			0.40	1.00
Satd. Flow (perm)	1719	3438	1538	1719	3438	1538	1132	1647			732	1538
Volume (vph)	270	1250	170	70	550	60	70	60	90	40	40	120
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	287	1330	181	74	585	64	74	64	96	43	43	128
RTOR Reduction (vph)	0	0	42	0	0	26	0	51	0	0	0	114
Lane Group Flow (vph)	287	1330	139	74	585	38	74	109	0	0	86	14
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot		custom	Prot		custom	Perm			Perm		Perm
Protected Phases	5			1				3			7	
Permitted Phases		2	2		6	6	3			7		7
Actuated Green, G (s)	23.3	85.9	85.9	8.3	69.9	69.9	12.8	12.8			12.8	12.8
Effective Green, g (s)	24.3	86.9	86.9	8.3	70.9	70.9	12.8	12.8			12.8	12.8
Actuated g/C Ratio	0.20	0.72	0.72	0.07	0.59	0.59	0.11	0.11			0.11	0.11
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	348	2490	1114	119	2031	909	121	176			78	164
v/s Ratio Prot	c0.17			0.04				0.07				
v/s Ratio Perm		c0.39	0.09		0.17	0.02	0.07				c0.12	0.01
v/c Ratio	0.82	0.53	0.12	0.62	0.29	0.04	0.61	0.62			1.10	0.08
Uniform Delay, d1	45.8	7.4	5.0	54.3	12.1	10.3	51.2	51.3			53.6	48.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	14.0	0.8	0.2	7.1	0.4	0.1	8.8	6.4			132.5	0.2
Delay (s)	59.8	8.3	5.2	61.4	12.5	10.4	60.1	57.6			186.1	48.5
Level of Service	E	A	A	E	B	B	E	E			F	D
Approach Delay (s)		16.2			17.3			58.4			103.8	
Approach LOS		B			B			E			F	

Intersection Summary			
HCM Average Control Delay	26.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
15: Oakley Road & Neroly Road

2010 PM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	80	60	10	70	90	50	190	10	150	290	10
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	10	82	61	10	71	92	51	194	10	153	296	10

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	153	173	255	459
Volume Left (vph)	10	10	51	153
Volume Right (vph)	61	92	10	10
Hadj (s)	-0.19	-0.27	0.05	0.09
Departure Headway (s)	6.1	6.0	5.7	5.4
Degree Utilization, x	0.26	0.29	0.41	0.69
Capacity (veh/h)	506	514	577	637
Control Delay (s)	11.2	11.3	12.6	19.8
Approach Delay (s)	11.2	11.3	12.6	19.8
Approach LOS	B	B	B	C

Intersection Summary			
Delay	15.4		
HCM Level of Service	C		
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
16: Oakley Road & Live Oak Ave

2010 PM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	170	30	40	130	10	30	30	30	70	80	10
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	11	189	33	44	144	11	33	33	33	78	89	11

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	233	200	100	178
Volume Left (vph)	11	44	33	78
Volume Right (vph)	33	11	33	11
Hadj (s)	-0.04	0.05	-0.10	0.08
Departure Headway (s)	4.9	5.0	5.2	5.2
Degree Utilization, x	0.32	0.28	0.14	0.26
Capacity (veh/h)	689	668	624	630
Control Delay (s)	10.1	9.9	9.0	10.0
Approach Delay (s)	10.1	9.9	9.0	10.0
Approach LOS	B	A	A	B

Intersection Summary			
Delay	9.9		
HCM Level of Service	A		
Intersection Capacity Utilization	43.1%	ICU Level of Service	A
Analysis Period (min)	15		

17: Oakley Road & Empire Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↑	↱		↰↑	↱	↰	↑↑↱		↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95		1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1727	1583		1812	1583	1770	3521		1770	1863	1583
Flt Permitted	0.95	0.98	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1727	1583		1812	1583	1770	3521		1770	1863	1583
Volume (vph)	110	40	200	50	40	60	140	290	10	140	390	70
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	120	43	217	54	43	65	152	315	11	152	424	76
RTOR Reduction (vph)	0	0	196	0	0	57	0	2	0	0	0	44
Lane Group Flow (vph)	79	84	21	0	97	8	152	324	0	152	424	32
Turn Type	Split		Perm	Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8						6
Actuated Green, G (s)	6.4	6.4	6.4		7.5	7.5	7.0	26.4		8.3	27.7	27.7
Effective Green, g (s)	6.4	6.4	6.4		8.5	8.5	8.0	27.4		9.3	28.7	28.7
Actuated g/C Ratio	0.09	0.09	0.09		0.13	0.13	0.12	0.41		0.14	0.42	0.42
Clearance Time (s)	4.0	4.0	4.0		5.0	5.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	159	164	150		228	199	209	1427		244	791	672
v/s Ratio Prot	0.05	c0.05			c0.05		c0.09	0.09		0.09	c0.23	
v/s Ratio Perm			0.01			0.01						0.02
v/c Ratio	0.50	0.51	0.14		0.43	0.04	0.73	0.23		0.62	0.54	0.05
Uniform Delay, d1	29.1	29.1	28.1		27.3	26.0	28.7	13.2		27.5	14.5	11.4
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.4	2.7	0.4		1.3	0.1	11.9	0.1		4.9	0.7	0.0
Delay (s)	31.5	31.8	28.5		28.6	26.1	40.6	13.2		32.4	15.2	11.5
Level of Service	C	C	C		C	C	D	B		C	B	B
Approach Delay (s)		29.8			27.6			22.0			18.8	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	23.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	67.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

18: Main Street & Empire Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑↱		↰↰	↑	↱		↰↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.98	1.00
Satd. Flow (prot)	1719	3539	1538	1770	3528		3335	1810	1583		1791	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.98	1.00
Satd. Flow (perm)	1719	3539	1538	1770	3528		3335	1810	1583		1791	1538
Volume (vph)	50	920	390	190	460	10	200	30	230	20	20	20
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	53	979	415	202	489	11	213	32	245	21	21	21
RTOR Reduction (vph)	0	0	250	0	2	0	0	0	202	0	0	20
Lane Group Flow (vph)	53	979	165	202	498	0	213	32	43	0	42	1
Heavy Vehicles (%)	5%	2%	5%	2%	2%	2%	5%	5%	2%	2%	5%	5%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	2.9	24.9	24.9	9.1	31.1		10.4	10.4	10.4		1.9	1.9
Effective Green, g (s)	3.9	25.9	25.9	10.1	32.1		11.4	11.4	11.4		1.9	1.9
Actuated g/C Ratio	0.06	0.40	0.40	0.15	0.49		0.17	0.17	0.17		0.03	0.03
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	103	1404	610	274	1734		582	316	276		52	45
v/s Ratio Prot	0.03	c0.28		c0.11	0.14		c0.06	0.02			c0.02	
v/s Ratio Perm			0.11						0.03			0.00
v/c Ratio	0.51	0.70	0.27	0.74	0.29		0.37	0.10	0.15		0.81	0.01
Uniform Delay, d1	29.8	16.4	13.3	26.3	9.8		23.8	22.6	22.9		31.5	30.8
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	4.3	1.5	0.2	9.9	0.1		0.4	0.1	0.3		58.8	0.1
Delay (s)	34.1	18.0	13.6	36.2	9.9		24.2	22.8	23.1		90.4	30.9
Level of Service	C	B	B	D	A		C	C	C		F	C
Approach Delay (s)		17.3			17.5			23.6			70.5	
Approach LOS		B			B			C			E	

Intersection Summary			
HCM Average Control Delay	19.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	65.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

19: Main Street & Vintage Parkway

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑	↑↑↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.96		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3406		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3539	3406		1770	1583
Volume (vph)	180	920	510	170	180	120
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	191	979	543	181	191	128
RTOR Reduction (vph)	0	0	37	0	0	106
Lane Group Flow (vph)	191	979	687	0	191	22
Turn Type	Prot					Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	9.5	37.0	23.5		9.8	9.8
Effective Green, g (s)	9.5	38.0	24.5		9.8	9.8
Actuated g/C Ratio	0.17	0.68	0.44		0.18	0.18
Clearance Time (s)	4.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	301	2410	1495		311	278
v/s Ratio Prot	c0.11	0.28	c0.20		c0.11	
v/s Ratio Perm						0.01
v/c Ratio	0.63	0.41	0.46		0.61	0.08
Uniform Delay, d1	21.5	3.9	11.0		21.3	19.2
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	4.3	0.1	0.2		3.6	0.1
Delay (s)	25.9	4.0	11.2		24.8	19.4
Level of Service	C	A	B		C	B
Approach Delay (s)		7.6	11.2		22.6	
Approach LOS		A	B		C	

Intersection Summary			
HCM Average Control Delay	11.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	55.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

20: Main Street & O'Hara Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑↱			↰↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85			0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1770	1863	1583	1770	1860		1770	1583			1695	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.76	1.00			0.93	
Satd. Flow (perm)	1770	1863	1583	1770	1860		1409	1583			1620	
Volume (vph)	5	930	200	20	580	5	130	0	50	1	0	1
Peak-hour factor, PHF	0.92	0.94	0.94	0.94	0.94	0.92	0.94	0.92	0.94	0.92	0.92	0.92
Adj. Flow (vph)	5	989	213	21	617	5	138	0	53	1	0	1
RTOR Reduction (vph)	0	0	70	0	0	0	0	44	0	0	1	0
Lane Group Flow (vph)	5	989	143	21	622	0	138	9	0	0	1	0
Turn Type	Prot		Perm	Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4				2			6		
Actuated Green, G (s)	0.7	54.6	54.6	1.4	55.3		13.0	13.0			14.0	
Effective Green, g (s)	0.7	55.6	55.6	1.4	56.3		14.0	14.0			14.0	
Actuated g/C Ratio	0.01	0.67	0.67	0.02	0.68		0.17	0.17			0.17	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	15	1248	1060	30	1262		238	267			273	
v/s Ratio Prot	0.00	c0.53		c0.01	0.33			0.01				
v/s Ratio Perm			0.09				c0.10				0.00	
v/c Ratio	0.33	0.79	0.13	0.70	0.49		0.58	0.03			0.00	
Uniform Delay, d1	40.9	9.6	5.0	40.6	6.4		31.8	28.8			28.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	12.7	3.5	0.1	52.7	0.3		3.4	0.1			0.0	
Delay (s)	53.6	13.2	5.0	93.3	6.8		35.2	28.9			28.7	
Level of Service	D	B	A	F	A		D	C			C	
Approach Delay (s)		11.9			9.6			33.4			28.7	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM Average Control Delay	13.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	83.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
21: Cypress Road & Empire Avenue

2010 PM
11/6/2006

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↱		↰	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.95		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3370		1770	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	3370		1770	3539
Volume (vph)	120	160	340	160	190	460
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	128	170	362	170	202	489
RTOR Reduction (vph)	0	138	84	0	0	0
Lane Group Flow (vph)	128	32	448	0	202	489
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	8.3	8.3	18.4		8.4	30.8
Effective Green, g (s)	9.3	9.3	19.4		8.4	31.8
Actuated g/C Ratio	0.19	0.19	0.40		0.17	0.65
Clearance Time (s)	5.0	5.0	5.0		4.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	335	300	1332		303	2292
v/s Ratio Prot	c0.07		c0.13		c0.11	0.14
v/s Ratio Perm		0.02				
v/c Ratio	0.38	0.11	0.34		0.67	0.21
Uniform Delay, d1	17.4	16.5	10.4		19.0	3.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.7	0.2	0.2		5.5	0.0
Delay (s)	18.1	16.6	10.5		24.5	3.6
Level of Service	B	B	B		C	A
Approach Delay (s)	17.3		10.5			9.7
Approach LOS	B		B			A

Intersection Summary			
HCM Average Control Delay	11.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	49.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	41.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
22: Cypress Road & Main Street

2010 PM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↱	↱	↰	↑↑	↱	↰↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	0.95	1.00	0.95	1.00	0.97	0.95	
Frt	1.00	0.95		1.00	0.99	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3371		1770	1753	1504	1770	3539	1583	3433	3482	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3371		1770	1753	1504	1770	3539	1583	3433	3482	
Volume (vph)	30	130	60	100	190	250	30	310	100	470	420	50
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	33	144	67	111	211	278	33	344	111	522	467	56
RTOR Reduction (vph)	0	54	0	0	3	199	0	0	71	0	9	0
Lane Group Flow (vph)	33	157	0	111	222	65	33	344	40	522	514	0
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			
Actuated Green, G (s)	1.8	14.5		5.1	17.8	17.8	1.8	25.9	25.9	11.1	35.2	
Effective Green, g (s)	1.8	14.5		5.1	17.8	17.8	1.8	25.9	25.9	11.1	35.2	
Actuated g/C Ratio	0.02	0.20		0.07	0.25	0.25	0.02	0.36	0.36	0.15	0.48	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	44	673		124	430	369	44	1263	565	525	1688	
v/s Ratio Prot	0.02	0.05		c0.06	c0.13		0.02	0.10		c0.15	c0.15	
v/s Ratio Perm						0.04			0.03			
v/c Ratio	0.75	0.23		0.90	0.52	0.18	0.75	0.27	0.07	0.99	0.30	
Uniform Delay, d1	35.2	24.4		33.5	23.7	21.6	35.2	16.6	15.4	30.7	11.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	51.4	0.2		49.7	1.0	0.2	51.4	0.5	0.2	37.6	0.5	
Delay (s)	86.6	24.6		83.2	24.7	21.8	86.6	17.2	15.6	68.3	11.8	
Level of Service	F	C		F	C	C	F	B	B	E	B	
Approach Delay (s)		33.0			34.3			21.5			40.0	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM Average Control Delay	34.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	72.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
23: Neroly Road & Live Oak Ave

2010 PM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↱			✢			✢	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	20	190	150	80	160	40	70	40	40	50	120	50
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	207	163	87	174	43	76	43	43	54	130	54

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	125	266	174	130	163	239
Volume Left (vph)	22	0	87	0	76	54
Volume Right (vph)	0	163	0	43	43	54
Hadj (s)	0.12	-0.39	0.28	-0.20	-0.03	-0.06
Departure Headway (s)	6.4	5.9	6.7	6.2	6.2	6.0
Degree Utilization, x	0.22	0.43	0.32	0.22	0.28	0.40
Capacity (veh/h)	529	580	506	544	518	553
Control Delay (s)	10.0	12.1	11.6	9.7	11.6	12.9
Approach Delay (s)	11.4		10.8		11.6	12.9
Approach LOS	B		B		B	B

Intersection Summary			
Delay	11.6		
HCM Level of Service	B		
Intersection Capacity Utilization	44.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
24: Laurel Road & Live Oak Avenue

2010 PM
11/6/2006

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰↰	↑↑↑	↑↑↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	0.91	0.91		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3433	5085	5048		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	3433	5085	5048		1770	1583
Volume (vph)	230	900	980	50	90	190
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	250	978	1065	54	98	207
RTOR Reduction (vph)	0	0	8	0	0	178
Lane Group Flow (vph)	250	978	1111	0	98	29
Turn Type	Prot					Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	6.8	32.4	21.6		6.5	6.5
Effective Green, g (s)	6.8	32.4	21.6		6.5	6.5
Actuated g/C Ratio	0.14	0.69	0.46		0.14	0.14
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	498	3513	2325		245	219
v/s Ratio Prot	c0.07	0.19	c0.22		c0.06	
v/s Ratio Perm						0.02
v/c Ratio	0.50	0.28	0.48		0.40	0.13
Uniform Delay, d1	18.5	2.8	8.8		18.4	17.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.8	0.0	0.2		1.1	0.3
Delay (s)	19.3	2.8	8.9		19.5	18.0
Level of Service	B	A	A		B	B
Approach Delay (s)		6.2	8.9		18.5	
Approach LOS		A	A		B	

Intersection Summary			
HCM Average Control Delay	8.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	46.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	41.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

25: Laurel Road & Empire Avenue

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.98		1.00	0.97		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3483		1770	3474		1770	3443		1770	3289	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3483		1770	3474		1770	3443		1770	3289	
Volume (vph)	200	760	90	80	640	90	150	410	90	190	270	240
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	213	809	96	85	681	96	160	436	96	202	287	255
RTOR Reduction (vph)	0	12	0	0	15	0	0	26	0	0	195	0
Lane Group Flow (vph)	213	893	0	85	762	0	160	506	0	202	347	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	10.5	24.8		4.6	18.9		8.6	14.8		10.4	16.6	
Effective Green, g (s)	10.5	24.8		4.6	18.9		8.6	14.8		10.4	16.6	
Actuated g/C Ratio	0.15	0.35		0.07	0.27		0.12	0.21		0.15	0.24	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	263	1223		115	930		216	722		261	773	
v/s Ratio Prot	c0.12	c0.26		0.05	0.22		0.09	c0.15		c0.11	0.11	
v/s Ratio Perm												
v/c Ratio	0.81	0.73		0.74	0.82		0.74	0.70		0.77	0.45	
Uniform Delay, d1	29.1	20.0		32.4	24.3		29.9	25.8		29.0	23.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	16.6	2.3		21.8	5.7		12.8	3.1		13.3	0.4	
Delay (s)	45.7	22.3		54.2	30.0		42.7	28.9		42.3	23.5	
Level of Service	D	C		D	C		D	C		D	C	
Approach Delay (s)		26.7			32.4			32.1			28.6	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	29.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	70.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 No Project                                      10/23/06
========================================================================
INTERSECTION     1 Minaker/Wilbur                    Oakley
Count Date                   Time                Peak Hour
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            20   10   10
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    10 ---  1.0   1.0  1.1  1.1   1.1 ---   10  RIGHT
                                                          STREET NAME:
THRU   380 ---> 2.1  (NO. OF LANES)   2.1<---  180  THRU  Wilbur

RIGHT  160 ---  1.1   1.1  1.1  1.0   1.0 ---   30  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  60    0   40                         Urb=N, Rur=N
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Minaker
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      40          10 *     1650     0.0061
    THRU (T)        0           0       1650     0.0000
    LEFT (L)       60          60       1650     0.0364     0.0364
    T + L                      60       1650     0.0364
------------------------------------------------------------------------
SB  RIGHT (R)      20          10 *     1650     0.0061
    THRU (T)       10          10       1650     0.0061
    LEFT (L)       10          10       1650     0.0061
    T + L                      20       1650     0.0121     0.0121
------------------------------------------------------------------------
EB  RIGHT (R)     160         160       1650     0.0970
    THRU (T)      380         380       3300     0.1152
    LEFT (L)       10          10       1650     0.0061
    T + R                     540       3300     0.1636     0.1636
------------------------------------------------------------------------
WB  RIGHT (R)      10          10       1650     0.0061
    THRU (T)      180         180       3300     0.0545
    LEFT (L)       30          30       1650     0.0182     0.0182
    T + R                     190       3300     0.0576
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.23
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_NP.INT,VOL=2010_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 No Project                                      10/23/06
========================================================================
INTERSECTION     6 Hillcrest/18th St                 Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------            30  120   60
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    40 ---  1.0   1.0  1.0  1.0   1.1 ---   40  RIGHT
                                                          STREET NAME:
THRU   410 ---> 2.1  (NO. OF LANES)   2.1<---  390  THRU  18th St

RIGHT  230 ---  1.1   1.0  1.0  1.0   1.0 ---  330  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 170  150  270                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Hillcrest
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     270           0 *     1650     0.0000
    THRU (T)      150         150       1650     0.0909
    LEFT (L)      170         170       1650     0.1030     0.1030
------------------------------------------------------------------------
SB  RIGHT (R)      30           0 *     1650     0.0000
    THRU (T)      120         120       1650     0.0727     0.0727
    LEFT (L)       60          60       1650     0.0364
------------------------------------------------------------------------
EB  RIGHT (R)     230         230       1650     0.1394
    THRU (T)      410         410       3300     0.1242
    LEFT (L)       40          40       1650     0.0242
    T + R                     640       3300     0.1939     0.1939
------------------------------------------------------------------------
WB  RIGHT (R)      40          40       1650     0.0242
    THRU (T)      390         390       3300     0.1182
    LEFT (L)      330         330       1650     0.2000     0.2000
    T + R                     430       3300     0.1303
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.57
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_NP.INT,VOL=2010_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 No Project                                      10/23/06
========================================================================
INTERSECTION     7 Viera/18th St                     Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       2-PHASE SIGNAL
-----------            70   60   60
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    60 ---  1.0   1.1  1.1  1.1   1.1 ---   20  RIGHT
                                                          STREET NAME:
THRU   580 ---> 2.0  (NO. OF LANES)   1.1<---  520  THRU  18th St

RIGHT  110 ---  1.0   1.1  1.1  1.0   1.0 ---   10  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  90   10   20                         Urb=B, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Viera
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      20          10 *     1800     0.0056
    THRU (T)       10          10       1800     0.0056
    LEFT (L)       90          90       1800     0.0500     0.0500
    T + L                     100       1800     0.0556
------------------------------------------------------------------------
SB  RIGHT (R)      70          70       1800     0.0389
    THRU (T)       60          60       1800     0.0333
    LEFT (L)       60          60       1800     0.0333
    T + R                     130       1800     0.0722
    T + L                     120       1800     0.0667
    T + R + L                 190       1800     0.1056     0.1056
------------------------------------------------------------------------
EB  RIGHT (R)     110          20 *     1800     0.0111
    THRU (T)      580         580       3600     0.1611
    LEFT (L)       60          60       1800     0.0333     0.0333
------------------------------------------------------------------------
WB  RIGHT (R)      20          20       1800     0.0111
    THRU (T)      520         520       1800     0.2889
    LEFT (L)       10          10       1800     0.0056
    T + R                     540       1800     0.3000     0.3000
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.49
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_NP.INT,VOL=2010_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 No Project                                      10/23/06
========================================================================
INTERSECTION     8 Phillips Lane/18th Street         Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------           160   10  130
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   140 ---  1.0   1.1  1.1  2.0   1.0 ---  120  RIGHT
                                                          STREET NAME:
THRU   490 ---> 2.1  (NO. OF LANES)   2.0<---  360  THRU  18th Street

RIGHT   10 ---  1.1   1.0  1.1  1.1   1.0 ---   10  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  10   10   20                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Phillips Lane
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      20          20       1650     0.0121
    THRU (T)       10          10       1650     0.0061
    LEFT (L)       10          10       1650     0.0061
    T + R                      30       1650     0.0182     0.0182
------------------------------------------------------------------------
SB  RIGHT (R)     160         160       1650     0.0970
    THRU (T)       10          10       1650     0.0061
    LEFT (L)      130         130       3000     0.0433
    T + R                     170       1650     0.1030     0.1030
------------------------------------------------------------------------
EB  RIGHT (R)      10          10       1650     0.0061
    THRU (T)      490         490       3300     0.1485
    LEFT (L)      140         140       1650     0.0848     0.0848
    T + R                     500       3300     0.1515
------------------------------------------------------------------------
WB  RIGHT (R)     120          49 *     1650     0.0297
    THRU (T)      360         360       3300     0.1091     0.1091
    LEFT (L)       10          10       1650     0.0061
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.32
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_NP.INT,VOL=2010_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 No Project                                      10/23/06
========================================================================
INTERSECTION     9 SR 160 SB Ramp/Main Street        Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            20   30   80
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    30 ---  1.0   1.1  1.1  1.0   1.0 ---  100  RIGHT
                                                          STREET NAME:
THRU   580 ---> 2.1  (NO. OF LANES)   2.0<---  410  THRU  Main Street

RIGHT   60 ---  1.1   1.0  1.1  1.1   2.0 ---  400  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  40   20  120                         Urb=B, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 SB Ramp
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     120        120       1650     0.0727
    THRU (T)       20         20       1650     0.0121
    LEFT (L)       40         40       1650     0.0242
    T + R                    140       1650     0.0848     0.0848
------------------------------------------------------------------------
SB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)       30         30       1650     0.0182
    LEFT (L)       80         80       1650     0.0485     0.0485
    T + R                     50       1650     0.0303
------------------------------------------------------------------------
EB  RIGHT (R)      60         60       1650     0.0364
    THRU (T)      580        580       3300     0.1758
    LEFT (L)       30         30       1650     0.0182
    T + R                    640       3300     0.1939     0.1939
------------------------------------------------------------------------
WB  RIGHT (R)     100         20 *     1650     0.0121
    THRU (T)      410        410       3300     0.1242
    LEFT (L)      400        400       3000     0.1333     0.1333
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.46
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_NP.INT,VOL=2010_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 No Project                                      10/23/06
========================================================================
INTERSECTION    10 SR 160 NB Ramp/Main Street        Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0    0    0
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  RIGHT
                                                          STREET NAME:
THRU   730 ---> 2.1  (NO. OF LANES)   2.0<---  820  THRU  Main Street

RIGHT   50 ---  1.1   1.0  0.0  2.5   1.0 ---   60  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  90    0 1160                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 NB Ramp
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)    1160       1051 *     3127     0.3361     0.3361
    LEFT (L)       90         90       1720     0.0523
------------------------------------------------------------------------
EB  RIGHT (R)      50         50       1720     0.0291
    THRU (T)      730        730       3440     0.2122
    T + R                    780       3440     0.2267     0.2267
------------------------------------------------------------------------
WB  THRU (T)      820        820       3440     0.2384
    LEFT (L)       60         60       1720     0.0349     0.0349
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.60
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_NP.INT,VOL=2010_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 No Project                                      10/23/06
========================================================================
INTERSECTION    11 Neroly/Main Street                Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------            70   90  250
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    90 ---  1.0   1.0  1.1  2.1   1.0 ---  150  RIGHT
                                                          STREET NAME:
THRU  1410 ---> 2.1  (NO. OF LANES)   3.0<---  590  THRU  Main Street

RIGHT  390 ---  1.1   2.0  1.1  1.1   1.0 ---   30  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 220  100   60                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Neroly
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      60         60       1650     0.0364
    THRU (T)      100        100       1650     0.0606
    LEFT (L)      220        220       3000     0.0733
    T + R                    160       1650     0.0970     0.0970
------------------------------------------------------------------------
SB  RIGHT (R)      70          0 *     1650     0.0000
    THRU (T)       90         90       1650     0.0545
    LEFT (L)      250        250       3000     0.0833
    T + L                    340       3000     0.1133     0.1133
------------------------------------------------------------------------
EB  RIGHT (R)     390        390       1650     0.2364
    THRU (T)     1410       1410       3300     0.4273
    LEFT (L)       90         90       1650     0.0545
    T + R                   1800       3300     0.5455     0.5455
------------------------------------------------------------------------
WB  RIGHT (R)     150         13 *     1650     0.0079
    THRU (T)      590        590       4950     0.1192
    LEFT (L)       30         30       1650     0.0182     0.0182
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.77
     INTERSECTION LEVEL OF SERVICE:                             C
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_NP.INT,VOL=2010_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 No Project                                      10/23/06
========================================================================
INTERSECTION    13 Live Oak/Main Street              Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0    0    0
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  RIGHT
                                                          STREET NAME:
THRU  1650 ---> 2.1  (NO. OF LANES)   2.0<---  720  THRU  Main Street

RIGHT   70 ---  1.1   1.0  0.0  1.0   1.0 ---   20  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  50    0   40                         Urb=N, Rur=N
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      40         20 *     1720     0.0116
    LEFT (L)       50         50       1720     0.0291     0.0291
------------------------------------------------------------------------
EB  RIGHT (R)      70         70       1720     0.0407
    THRU (T)     1650       1650       3440     0.4797
    T + R                   1720       3440     0.5000     0.5000
------------------------------------------------------------------------
WB  THRU (T)      720        720       3440     0.2093
    LEFT (L)       20         20       1720     0.0116     0.0116
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.54
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_NP.INT,VOL=2010_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 No Project                                      10/23/06
========================================================================
INTERSECTION    14 Big Break/Main Street             Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------           120   40   40
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   270 ---  1.0   1.0  1.1  1.1   1.0 ---   60  RIGHT
                                                          STREET NAME:
THRU  1250 ---> 2.0  (NO. OF LANES)   2.0<---  550  THRU  Main Street

RIGHT  170 ---  1.0   1.0  1.1  1.1   1.0 ---   70  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  70   60   90                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Big Break
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      90         90       1650     0.0545
    THRU (T)       60         60       1650     0.0364
    LEFT (L)       70         70       1650     0.0424
    T + R                    150       1650     0.0909     0.0909
------------------------------------------------------------------------
SB  RIGHT (R)     120          0 *     1650     0.0000
    THRU (T)       40         40       1650     0.0242
    LEFT (L)       40         40       1650     0.0242     0.0242
    T + L                     80       1650     0.0485
------------------------------------------------------------------------
EB  RIGHT (R)     170        100 *     1650     0.0606
    THRU (T)     1250       1250       3300     0.3788     0.3788
    LEFT (L)      270        270       1650     0.1636
------------------------------------------------------------------------
WB  RIGHT (R)      60         20 *     1650     0.0121
    THRU (T)      550        550       3300     0.1667
    LEFT (L)       70         70       1650     0.0424     0.0424
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.54
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_NP.INT,VOL=2010_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 No Project                                      10/23/06
========================================================================
INTERSECTION    17 Empire Ave/Oakley Road            Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------            70  390  140
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? Y
LEFT   110 ---  2.1   1.0  1.0  1.0   1.0 ---   60  RIGHT
                                                          STREET NAME:
THRU    40 ---> 1.1  (NO. OF LANES)   1.1<---   40  THRU  Oakley Road

RIGHT  200 ---  1.0   1.0  2.1  1.1   1.1 ---   50  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 140  290   10                         Urb=B, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire Ave
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      290        290       3300     0.0879
    LEFT (L)      140        140       1650     0.0848     0.0848
    T + R                    300       3300     0.0909
------------------------------------------------------------------------
SB  RIGHT (R)      70         10 *     1650     0.0061
    THRU (T)      390        390       1650     0.2364     0.2364
    LEFT (L)      140        140       1650     0.0848
------------------------------------------------------------------------
EB  RIGHT (R)     200         60 *     1650     0.0364
    THRU (T)       40         40       1650     0.0242
    LEFT (L)      110        110       3000     0.0367
    T + L                    150       3000     0.0500     0.0500
------------------------------------------------------------------------
WB  RIGHT (R)      60          0 *     1650     0.0000
    THRU (T)       40         40       1650     0.0242
    LEFT (L)       50         50       1650     0.0303
    T + L                     90       1650     0.0545     0.0545
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.43
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_NP.INT,VOL=2010_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 No Project                                      10/23/06
========================================================================
INTERSECTION    18 Empire Avenue/Main Street         Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------            20   20   20
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    50 ---  1.0   1.0  1.1  1.1   1.1 ---   10  RIGHT
                                                          STREET NAME:
THRU   920 ---> 2.0  (NO. OF LANES)   2.1<---  460  THRU  Main Street

RIGHT  390 ---  1.0   2.0  1.0  1.0   1.0 ---  190  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 200   30  230                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Empire Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     230         40 *     1650     0.0242
    THRU (T)       30         30       1650     0.0182
    LEFT (L)      200        200       3000     0.0667     0.0667
------------------------------------------------------------------------
SB  RIGHT (R)      20          0 *     1650     0.0000
    THRU (T)       20         20       1650     0.0121
    LEFT (L)       20         20       1650     0.0121
    T + L                     40       1650     0.0242     0.0242
------------------------------------------------------------------------
EB  RIGHT (R)     390        280 *     1650     0.1697
    THRU (T)      920        920       3300     0.2788     0.2788
    LEFT (L)       50         50       1650     0.0303
------------------------------------------------------------------------
WB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      460        460       3300     0.1394
    LEFT (L)      190        190       1650     0.1152     0.1152
    T + R                    470       3300     0.1424
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.48
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_NP.INT,VOL=2010_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 No Project                                      10/23/06
========================================================================
INTERSECTION    19 Vintage/Main Street               Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------           120    0  180
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   180 ---  1.0   1.0  0.0  1.0   1.1 ---  170  RIGHT
                                                          STREET NAME:
THRU   920 ---> 2.0  (NO. OF LANES)   2.1<---  510  THRU  Main Street

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Vintage
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)     120          0 *     1720     0.0000
    LEFT (L)      180        180       1720     0.1047     0.1047
------------------------------------------------------------------------
EB  THRU (T)      920        920       3440     0.2674
    LEFT (L)      180        180       1720     0.1047     0.1047
------------------------------------------------------------------------
WB  RIGHT (R)     170        170       1720     0.0988
    THRU (T)      510        510       3440     0.1483
    T + R                    680       3440     0.1977     0.1977
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.41
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_NP.INT,VOL=2010_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 No Project                                      10/23/06
========================================================================
INTERSECTION    20 O'Hara Avenue/Main Street         Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------             1    0    1
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     5 ---  1.0   1.1  1.1  1.1   1.1 ---    5  RIGHT
                                                          STREET NAME:
THRU   930 ---> 1.0  (NO. OF LANES)   1.1<---  580  THRU  Main Street

RIGHT  200 ---  1.0   1.0  1.1  1.1   1.0 ---   20  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 130    0   50                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: O'Hara Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)        0          0       1650     0.0000
    LEFT (L)      130        130       1650     0.0788     0.0788
    T + R                     50       1650     0.0303
------------------------------------------------------------------------
SB  RIGHT (R)       1          1       1650     0.0006
    THRU (T)        0          0       1650     0.0000
    LEFT (L)        1          1       1650     0.0006
    T + R                      1       1650     0.0006
    T + L                      1       1650     0.0006
    T + R + L                  2       1650     0.0012     0.0012
------------------------------------------------------------------------
EB  RIGHT (R)     200         70 *     1650     0.0424
    THRU (T)      930        930       1650     0.5636     0.5636
    LEFT (L)        5          5       1650     0.0030
------------------------------------------------------------------------
WB  RIGHT (R)       5          5       1650     0.0030
    THRU (T)      580        580       1650     0.3515
    LEFT (L)       20         20       1650     0.0121     0.0121
    T + R                    585       1650     0.3545
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.66
     INTERSECTION LEVEL OF SERVICE:                             B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_NP.INT,VOL=2010_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 No Project                                      10/23/06
========================================================================
INTERSECTION    21 Empire Avenue/Cypress Road        Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0  460  190
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  2.0  1.0   1.0 ---  160  RIGHT
                                                          STREET NAME:
THRU     0 ---> 0.0  (NO. OF LANES)   0.0<---    0  THRU  Cypress Road

RIGHT    0 ---  0.0   0.0  2.1  1.1   1.0 ---  120  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0  340  160                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     160        160       1720     0.0930
    THRU (T)      340        340       3440     0.0988
    T + R                    500       3440     0.1453     0.1453
------------------------------------------------------------------------
SB  THRU (T)      460        460       3440     0.1337
    LEFT (L)      190        190       1720     0.1105     0.1105
------------------------------------------------------------------------
WB  RIGHT (R)     160          0 *     1720     0.0000
    LEFT (L)      120        120       1720     0.0698     0.0698
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.33
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_NP.INT,VOL=2010_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 No Project                                      10/23/06
========================================================================
INTERSECTION    22 Main Street/Cypress               Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            50  420  470
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    30 ---  1.0   1.1  2.1  2.0   2.1 ---  250  RIGHT
                                                          STREET NAME:
THRU   130 ---> 2.1  (NO. OF LANES)   1.1<---  190  THRU  Cypress

RIGHT   60 ---  1.1   1.0  2.0  1.0   1.0 ---  100  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  30  310  100                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Main Street
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     100          0 *     1650     0.0000
    THRU (T)      310        310       3300     0.0939     0.0939
    LEFT (L)       30         30       1650     0.0182
------------------------------------------------------------------------
SB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)      420        420       3300     0.1273
    LEFT (L)      470        470       3000     0.1567     0.1567
    T + R                    470       3300     0.1424
------------------------------------------------------------------------
EB  RIGHT (R)      60         60       1650     0.0364
    THRU (T)      130        130       3300     0.0394
    LEFT (L)       30         30       1650     0.0182     0.0182
    T + R                    190       3300     0.0576
------------------------------------------------------------------------
WB  RIGHT (R)     250          0 *     3000     0.0000
    THRU (T)      190        190       1650     0.1152     0.1152
    LEFT (L)      100        100       1650     0.0606
    T + R                    190       3000     0.0633
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.38
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_NP.INT,VOL=2010_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 No Project                                      10/23/06
========================================================================
INTERSECTION    24 Live Oak/Laurel                   Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------           190    0   90
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   230 ---  2.0   1.0  0.0  1.0   1.1 ---   50  RIGHT
                                                          STREET NAME:
THRU   900 ---> 3.0  (NO. OF LANES)   3.1<---  980  THRU  Laurel

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)     190         63 *     1720     0.0366
    LEFT (L)       90         90       1720     0.0523     0.0523
------------------------------------------------------------------------
EB  THRU (T)      900        900       5160     0.1744
    LEFT (L)      230        230       3127     0.0736     0.0736
------------------------------------------------------------------------
WB  RIGHT (R)      50         50       1720     0.0291
    THRU (T)      980        980       5160     0.1899
    T + R                   1030       5160     0.1996     0.1996
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.33
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_NP.INT,VOL=2010_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2010 No Project                                      10/23/06
========================================================================
INTERSECTION    25 Empire/Laurel                     Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------           240  270  190
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   200 ---  1.0   1.1  2.1  1.0   1.1 ---   90  RIGHT
                                                          STREET NAME:
THRU   760 ---> 2.1  (NO. OF LANES)   2.1<---  640  THRU  Laurel

RIGHT   90 ---  1.1   1.0  2.1  1.1   1.0 ---   80  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 150  410   90                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      90         90       1650     0.0545
    THRU (T)      410        410       3300     0.1242
    LEFT (L)      150        150       1650     0.0909
    T + R                    500       3300     0.1515     0.1515
------------------------------------------------------------------------
SB  RIGHT (R)     240        240       1650     0.1455
    THRU (T)      270        270       3300     0.0818
    LEFT (L)      190        190       1650     0.1152     0.1152
    T + R                    510       3300     0.1545
------------------------------------------------------------------------
EB  RIGHT (R)      90         90       1650     0.0545
    THRU (T)      760        760       3300     0.2303
    LEFT (L)      200        200       1650     0.1212     0.1212
    T + R                    850       3300     0.2576
------------------------------------------------------------------------
WB  RIGHT (R)      90         90       1650     0.0545
    THRU (T)      640        640       3300     0.1939
    LEFT (L)       80         80       1650     0.0485
    T + R                    730       3300     0.2212     0.2212
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.61
     INTERSECTION LEVEL OF SERVICE:                             B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_NP.INT,VOL=2010_NP.PM,CAP=
```

Near Term (2010) With Project AM

1: Wilbur Avenue & Minaker Drive

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↰	↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	0.96		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.97	1.00
Satd. Flow (prot)	1770	3406		1770	3529			1777	1583		1803	1583
Flt Permitted	0.95	1.00		0.95	1.00			0.72	1.00		0.83	1.00
Satd. Flow (perm)	1770	3406		1770	3529			1346	1583		1546	1583
Volume (vph)	20	120	40	10	496	10	140	5	20	10	5	20
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	21	125	42	10	517	10	146	5	21	10	5	21
RTOR Reduction (vph)	0	20	0	0	1	0	0	0	16	0	0	16
Lane Group Flow (vph)	21	147	0	10	526	0	0	151	5	0	15	5
Turn Type	Prot			Prot			Perm		Perm	Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		4
Actuated Green, G (s)	1.4	26.2		1.3	26.1			11.0	11.0		11.0	11.0
Effective Green, g (s)	1.4	26.2		1.3	26.1			11.0	11.0		11.0	11.0
Actuated g/C Ratio	0.03	0.52		0.03	0.52			0.22	0.22		0.22	0.22
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	49	1767		46	1824			293	345		337	345
v/s Ratio Prot	c0.01	0.04		0.01	c0.15							
v/s Ratio Perm								c0.11	0.00		0.01	0.00
v/c Ratio	0.43	0.08		0.22	0.29			0.52	0.01		0.04	0.01
Uniform Delay, d1	24.2	6.1		24.1	6.9			17.4	15.5		15.6	15.5
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	5.9	0.0		2.4	0.1			1.5	0.0		0.1	0.0
Delay (s)	30.1	6.1		26.5	7.0			18.9	15.5		15.7	15.5
Level of Service	C	A		C	A			B	B		B	B
Approach Delay (s)		8.8			7.4			18.5			15.6	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	10.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	50.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	38.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

2: Wilbur Avenue & Viera Avenue

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱		↰	↑	↰↱	
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	159	20	14	463	70	24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	173	22	15	503	76	26
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			195		717	184
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			195		717	184
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		81	97
cM capacity (veh/h)			1379		392	859

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	195	15	503	102
Volume Left	0	15	0	76
Volume Right	22	0	0	26
cSH	1700	1379	1700	455
Volume to Capacity	0.11	0.01	0.30	0.22
Queue Length 95th (ft)	0	1	0	21
Control Delay (s)	0.0	7.6	0.0	15.2
Lane LOS		A		C
Approach Delay (s)	0.0	0.2		15.2
Approach LOS				C

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	36.4%	ICU Level of Service	A
Analysis Period (min)	15		

3: Wilbur Avenue & SR 160 SB Off

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱		↰	↑↑					↰		↱
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	163	40	10	357	0	0	0	0	79	0	160
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	168	41	10	368	0	0	0	0	81	0	165
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	368			209			393	577	189	577	598	184
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	368			209			393	577	189	577	598	184
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	100	100	79	100	80
cM capacity (veh/h)	1187			1359			430	422	821	397	411	827

Direction, Lane #	EB 1	WB 1	WB 2	WB 3	SB 1	SB 2
Volume Total	209	10	184	184	81	165
Volume Left	0	10	0	0	81	0
Volume Right	41	0	0	0	0	165
cSH	1700	1359	1700	1700	397	827
Volume to Capacity	0.12	0.01	0.11	0.11	0.21	0.20
Queue Length 95th (ft)	0	1	0	0	19	19
Control Delay (s)	0.0	7.7	0.0	0.0	16.4	10.4
Lane LOS		A			C	B
Approach Delay (s)	0.0	0.2			12.4	
Approach LOS					B	

Intersection Summary			
Average Delay	3.8		
Intersection Capacity Utilization	30.0%	ICU Level of Service	A
Analysis Period (min)	15		

4: Wilbur Avenue & SR 160 NB On

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑			↑↱		↰		↱			
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	30	212	0	0	327	134	40	0	20	0	0	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	32	226	0	0	348	143	43	0	21	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	490			226			463	780	113	596	709	245
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	490			226			463	780	113	596	709	245
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			100			91	100	98	100	100	100
cM capacity (veh/h)	1069			1340			471	316	919	370	347	755

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2
Volume Total	32	113	113	232	259	43	21
Volume Left	32	0	0	0	0	43	0
Volume Right	0	0	0	0	143	0	21
cSH	1069	1700	1700	1700	1700	471	919
Volume to Capacity	0.03	0.07	0.07	0.14	0.15	0.09	0.02
Queue Length 95th (ft)	2	0	0	0	0	7	2
Control Delay (s)	8.5	0.0	0.0	0.0	0.0	13.4	9.0
Lane LOS	A					B	A
Approach Delay (s)	1.1			0.0		11.9	
Approach LOS						B	

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	30.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
5: Wilbur Avenue & Bridgehead Road

2010 & Proj AM
11/6/2006

	⤴	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	30	0	202	0	0	0	441	30	0	0	30	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	0	220	0	0	0	479	33	0	0	33	22

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1
Volume Total (vph)	33	220	0	512	54
Volume Left (vph)	33	0	0	479	0
Volume Right (vph)	0	220	0	0	22
Hadj (s)	0.53	-0.67	0.00	0.22	-0.21
Departure Headway (s)	6.5	5.3	5.9	4.9	5.1
Degree Utilization, x	0.06	0.32	0.00	0.69	0.08
Capacity (veh/h)	518	635	542	716	653
Control Delay (s)	8.7	9.6	8.9	18.2	8.5
Approach Delay (s)	9.5		0.0	18.2	8.5
Approach LOS	A		A	C	A

Intersection Summary			
Delay	14.9		
HCM Level of Service	B		
Intersection Capacity Utilization	51.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
6: E 18th Street & Hillcrest Avenue

2010 & Proj AM
11/6/2006

	⤴	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑	↱	↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3377		1770	3499		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3377		1770	3499		1770	1863	1583	1770	1863	1583
Volume (vph)	10	160	70	196	366	30	190	100	160	40	70	40
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	11	178	78	218	407	33	211	111	178	44	78	44
RTOR Reduction (vph)	0	50	0	0	5	0	0	0	143	0	0	38
Lane Group Flow (vph)	11	206	0	218	435	0	211	111	35	44	78	6
Turn Type	Prot			Prot			Split		Perm	Split		Perm
Protected Phases	1	6		5	2		8	8		4	4	
Permitted Phases									8			4
Actuated Green, G (s)	0.3	15.9		8.9	25.0		10.1	10.1	10.1	6.4	6.4	6.4
Effective Green, g (s)	1.3	17.9		10.4	27.0		11.6	11.6	11.6	7.9	7.9	7.9
Actuated g/C Ratio	0.02	0.30		0.17	0.45		0.19	0.19	0.19	0.13	0.13	0.13
Clearance Time (s)	4.0	5.0		4.5	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	38	1011		308	1580		343	361	307	234	246	209
v/s Ratio Prot	0.01	0.06		c0.12	c0.12		c0.12	0.06		0.02	c0.04	
v/s Ratio Perm									0.02			0.00
v/c Ratio	0.29	0.20		0.71	0.28		0.62	0.31	0.11	0.19	0.32	0.03
Uniform Delay, d1	28.8	15.6		23.3	10.3		22.1	20.7	19.9	23.1	23.5	22.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.2	0.1		7.2	0.1		3.3	0.5	0.2	0.4	0.7	0.1
Delay (s)	33.0	15.7		30.5	10.4		25.3	21.1	20.0	23.5	24.3	22.7
Level of Service	C	B		C	B		C	C	C	C	C	C
Approach Delay (s)		16.4			17.0			22.5			23.6	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM Average Control Delay	19.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	59.8	Sum of lost time (s)	9.0
Intersection Capacity Utilization	44.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
7: E 18th Street & Viera Avenue

2010 & Proj AM
11/6/2006

	⤴	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↱			↰	↱		✥	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	0.96			1.00	0.85		0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00		0.99	
Satd. Flow (prot)	1770	3539	1583	1770	1790			1791	1583		1702	
Flt Permitted	0.36	1.00	1.00	0.59	1.00			0.78	1.00		0.93	
Satd. Flow (perm)	678	3539	1583	1100	1790			1454	1583		1594	
Volume (vph)	70	235	40	10	387	136	120	30	10	18	20	50
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	78	261	44	11	430	151	133	33	11	20	22	56
RTOR Reduction (vph)	0	0	17	0	18	0	0	0	8	0	42	0
Lane Group Flow (vph)	78	261	28	11	563	0	0	166	3	0	56	0
Turn Type	Perm		Perm	Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	28.0	28.0	28.0	28.0	28.0			10.4	10.4		10.4	
Effective Green, g (s)	29.0	29.0	29.0	29.0	29.0			11.4	11.4		11.4	
Actuated g/C Ratio	0.63	0.63	0.63	0.63	0.63			0.25	0.25		0.25	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	424	2212	989	688	1119			357	389		392	
v/s Ratio Prot		0.07			c0.31							
v/s Ratio Perm	0.11		0.02	0.01				c0.11	0.00		0.03	
v/c Ratio	0.18	0.12	0.03	0.02	0.50			0.46	0.01		0.14	
Uniform Delay, d1	3.7	3.5	3.3	3.3	4.8			14.9	13.2		13.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.2	0.0	0.0	0.0	0.4			1.0	0.0		0.2	
Delay (s)	3.9	3.5	3.3	3.3	5.1			15.9	13.2		13.8	
Level of Service	A	A	A	A	A			B	B		B	
Approach Delay (s)		3.6			5.1			15.7			13.8	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	6.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	46.4	Sum of lost time (s)	6.0
Intersection Capacity Utilization	57.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: E 18th Street & Phillips Lane

2010 & Proj AM
11/6/2006

	⤴	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱	↰	↱		↰↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.97	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.93		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3529		1770	3539	1583	1770	1723		3433	1653	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3529		1770	3539	1583	1770	1723		3433	1653	
Volume (vph)	40	282	5	10	529	30	10	10	10	20	10	30
Peak-hour factor, PHF	0.92	0.90	0.90	0.90	0.90	0.92	0.90	0.92	0.90	0.92	0.92	0.92
Adj. Flow (vph)	43	313	6	11	588	33	11	11	11	22	11	33
RTOR Reduction (vph)	0	1	0	0	0	23	0	9	0	0	28	0
Lane Group Flow (vph)	43	318	0	11	588	10	11	13	0	22	16	0
Turn Type	Prot			Prot		Perm	Split			Split		
Protected Phases	5	2		1	6		7	7		3	3	
Permitted Phases						6						
Actuated Green, G (s)	1.8	14.5		0.6	13.3	13.3	6.3	6.3		6.5	6.5	
Effective Green, g (s)	1.8	14.5		0.6	13.3	13.3	6.3	6.3		6.5	6.5	
Actuated g/C Ratio	0.04	0.33		0.01	0.30	0.30	0.14	0.14		0.15	0.15	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	73	1166		24	1072	480	254	247		508	245	
v/s Ratio Prot	c0.02	0.09		0.01	c0.17		0.01	c0.01		0.01	c0.01	
v/s Ratio Perm						0.01						
v/c Ratio	0.59	0.27		0.46	0.55	0.02	0.04	0.05		0.04	0.06	
Uniform Delay, d1	20.7	10.8		21.5	12.8	10.7	16.2	16.2		16.0	16.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	11.6	0.1		13.2	0.6	0.0	0.1	0.1		0.0	0.1	
Delay (s)	32.3	10.9		34.7	13.4	10.7	16.3	16.3		16.1	16.2	
Level of Service	C	B		C	B	B	B	B		B	B	
Approach Delay (s)		13.5			13.6			16.3			16.2	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	13.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	43.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	35.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
9: E 18th Street & SR 160 SB Off

2010 & Proj AM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰↰	↑↑	↱	↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.87		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3405		3335	3438	1538	1719	1573		1719	1674	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.73	1.00		0.67	1.00	
Satd. Flow (perm)	1719	3405		3335	3438	1538	1320	1573		1206	1674	
Volume (vph)	10	292	20	915	489	60	30	10	70	30	20	20
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	11	311	21	973	520	64	32	11	74	32	21	21
RTOR Reduction (vph)	0	4	0	0	0	12	0	70	0	0	20	0
Lane Group Flow (vph)	11	328	0	973	520	52	32	15	0	32	22	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases						6	8			4		
Actuated Green, G (s)	0.8	38.8		42.2	80.2	80.2	6.0	6.0		6.0	6.0	
Effective Green, g (s)	0.8	39.8		42.2	81.2	81.2	6.0	6.0		6.0	6.0	
Actuated g/C Ratio	0.01	0.40		0.42	0.81	0.81	0.06	0.06		0.06	0.06	
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	4.0	4.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	14	1355		1407	2792	1249	79	94		72	100	
v/s Ratio Prot	c0.01	c0.10		c0.29	0.15			0.01			0.01	
v/s Ratio Perm						0.03	0.02			c0.03		
v/c Ratio	0.79	0.24		0.69	0.19	0.04	0.41	0.16		0.44	0.22	
Uniform Delay, d1	49.5	20.1		23.6	2.1	1.8	45.3	44.6		45.4	44.8	
Progression Factor	1.00	1.00		0.53	0.29	0.05	1.00	1.00		1.00	1.00	
Incremental Delay, d2	130.6	0.4		1.3	0.1	0.1	1.2	0.3		1.6	0.4	
Delay (s)	180.1	20.5		13.7	0.7	0.1	46.5	44.9		47.0	45.2	
Level of Service	F	C		B	A	A	D	D		D	D	
Approach Delay (s)		25.6			8.8			45.4			46.0	
Approach LOS		C			A			D			D	

Intersection Summary			
HCM Average Control Delay	14.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Main Street & SR 160 NB On

2010 & Proj AM
11/6/2006

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↱		↰	↑↑	↰	↱↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	1.00	0.88
Frt	0.98		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3386		1719	3438	1719	2707
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3386		1719	3438	1719	2707
Volume (vph)	353	40	68	1375	90	672
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	388	44	75	1511	99	738
RTOR Reduction (vph)	6	0	0	0	0	362
Lane Group Flow (vph)	426	0	75	1511	99	376
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Turn Type			Prot			pm+ov
Protected Phases	2		1	6	8	1
Permitted Phases						8
Actuated Green, G (s)	53.4		24.0	82.4	8.6	32.6
Effective Green, g (s)	54.4		25.0	83.4	8.6	33.6
Actuated g/C Ratio	0.54		0.25	0.83	0.09	0.34
Clearance Time (s)	5.0		5.0	5.0	4.0	5.0
Vehicle Extension (s)	4.0		3.0	4.0	2.0	3.0
Lane Grp Cap (vph)	1842		430	2867	148	1018
v/s Ratio Prot	0.13		0.04	c0.44	c0.06	0.09
v/s Ratio Perm						0.05
v/c Ratio	0.23		0.17	0.53	0.67	0.37
Uniform Delay, d1	11.9		29.4	2.5	44.3	25.2
Progression Factor	0.16		1.17	0.73	1.00	1.00
Incremental Delay, d2	0.3		0.2	0.6	8.6	0.2
Delay (s)	2.2		34.4	2.4	52.9	25.4
Level of Service	A		C	A	D	C
Approach Delay (s)	2.2			3.9	28.6	
Approach LOS	A			A	C	

Intersection Summary			
HCM Average Control Delay	10.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Main Street & Bridgehead Road

2010 & Proj AM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑↑	↱	↰↰	↱		↰	↰↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.91	1.00	0.97	1.00		0.95	0.95	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.99	1.00
Satd. Flow (prot)	1719	3331		1719	4940	1538	3335	1738		1633	1699	1538
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.99	1.00
Satd. Flow (perm)	1719	3331		1719	4940	1538	3335	1738		1633	1699	1538
Volume (vph)	108	727	190	10	1123	342	200	139	50	115	74	120
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	117	790	207	11	1221	372	217	151	54	125	80	130
RTOR Reduction (vph)	0	16	0	0	0	195	0	16	0	0	0	114
Lane Group Flow (vph)	117	981	0	11	1221	177	217	189	0	100	105	16
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot		Perm	Split			Split		Perm
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases						6						7
Actuated Green, G (s)	10.0	55.5		1.2	46.7	46.7	14.3	14.3		12.0	12.0	12.0
Effective Green, g (s)	10.0	56.5		1.2	47.7	47.7	14.3	14.3		12.0	12.0	12.0
Actuated g/C Ratio	0.10	0.56		0.01	0.48	0.48	0.14	0.14		0.12	0.12	0.12
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	172	1882		21	2356	734	477	249		196	204	185
v/s Ratio Prot	c0.07	c0.29		0.01	0.25		0.07	c0.11		0.06	c0.06	
v/s Ratio Perm						0.12						0.01
v/c Ratio	0.68	0.52		0.52	0.52	0.24	0.45	0.76		0.51	0.51	0.08
Uniform Delay, d1	43.5	13.4		49.1	18.2	15.5	39.3	41.2		41.2	41.3	39.1
Progression Factor	0.92	0.86		1.24	0.62	0.68	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	7.8	0.9		8.5	0.7	0.6	0.3	11.1		0.9	0.9	0.1
Delay (s)	47.8	12.5		69.3	11.9	11.1	39.5	52.3		42.2	42.2	39.2
Level of Service	D	B		E	B	B	D	D		D	D	D
Approach Delay (s)		16.2			12.1			45.7			41.0	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM Average Control Delay	20.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Main Street & Sandy Lane

2010 & Proj AM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱	↰	↑	↱	↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3432		1719	3438	1583	1719	1863	1538	1770	1603	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3432		1719	3438	1583	1719	1863	1538	1770	1603	
Volume (vph)	45	837	10	10	1428	54	10	3	10	50	3	36
Peak-hour factor, PHF	0.92	0.90	0.90	0.90	0.90	0.92	0.90	0.92	0.90	0.92	0.92	0.92
Adj. Flow (vph)	49	930	11	11	1587	59	11	3	11	54	3	39
RTOR Reduction (vph)	0	0	0	0	0	15	0	0	10	0	37	0
Lane Group Flow (vph)	49	941	0	11	1587	44	11	3	1	54	5	0
Heavy Vehicles (%)	2%	5%	5%	5%	5%	2%	5%	2%	5%	2%	2%	2%
Turn Type	Prot			Prot		Perm	Prot		custom	Prot		
Protected Phases	5	2		1	6		3			7		
Permitted Phases						6		8	3		4	
Actuated Green, G (s)	5.5	70.3		1.5	66.3	66.3	4.5	1.2	4.5	9.0	4.7	
Effective Green, g (s)	5.5	71.3		1.5	67.3	67.3	5.5	1.2	5.5	10.0	5.7	
Actuated g/C Ratio	0.06	0.71		0.02	0.67	0.67	0.06	0.01	0.06	0.10	0.06	
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0	5.0	4.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	97	2447		26	2314	1065	95	22	85	177	91	
v/s Ratio Prot	0.03	c0.27		0.01	c0.46		0.01			c0.03		
v/s Ratio Perm						0.03		c0.00	0.00		0.00	
v/c Ratio	0.51	0.38		0.42	0.69	0.04	0.12	0.14	0.01	0.31	0.06	
Uniform Delay, d1	45.9	5.7		48.8	9.9	5.5	44.9	48.9	44.7	41.8	44.6	
Progression Factor	0.92	0.85		1.33	0.11	0.13	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.6	0.4		9.1	1.4	0.1	0.5	2.8	0.0	1.0	0.3	
Delay (s)	45.9	5.2		73.8	2.5	0.8	45.5	51.7	44.7	42.8	44.9	
Level of Service	D	A		E	A	A	D	D	D	D	D	
Approach Delay (s)		7.2			3.0			45.9			43.7	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM Average Control Delay	6.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
13: Main Street & Live Oak Ave

2010 & Proj AM
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑	↱	↰	↑↑↱		↰↰	↑↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		0.97	0.95	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3407		1719	3438	1583	1719	3423		3433	3444	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3407		1719	3438	1583	1719	3423		3433	3444	
Volume (vph)	44	820	52	37	1395	66	104	167	37	56	134	29
Peak-hour factor, PHF	0.92	0.90	0.90	0.90	0.90	0.92	0.90	0.92	0.90	0.92	0.92	0.92
Adj. Flow (vph)	48	911	58	41	1550	72	116	182	41	61	146	32
RTOR Reduction (vph)	0	3	0	0	0	29	0	22	0	0	20	0
Lane Group Flow (vph)	48	966	0	41	1550	43	116	201	0	61	158	0
Heavy Vehicles (%)	2%	5%	5%	5%	5%	2%	5%	2%	5%	2%	2%	2%
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases					6	6						
Actuated Green, G (s)	4.0	56.1		3.6	55.7	55.7	12.6	19.3		4.0	9.7	
Effective Green, g (s)	4.0	57.1		3.6	56.7	56.7	13.6	19.3		4.0	9.7	
Actuated g/C Ratio	0.04	0.57		0.04	0.57	0.57	0.14	0.19		0.04	0.10	
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0	5.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	71	1945		62	1949	898	234	661		137	334	
v/s Ratio Prot	0.03	c0.28		0.02	c0.45		c0.07	0.06		0.02	c0.05	
v/s Ratio Perm						0.03						
v/c Ratio	0.68	0.50		0.66	0.80	0.05	0.50	0.30		0.45	0.47	
Uniform Delay, d1	47.4	12.8		47.6	17.1	9.6	40.0	34.6		46.9	42.7	
Progression Factor	0.82	0.76		1.26	0.39	0.27	1.00	1.00		1.00	1.00	
Incremental Delay, d2	22.0	0.9		20.8	3.0	0.1	1.7	0.3		2.3	1.1	
Delay (s)	60.7	10.6		80.9	9.7	2.7	41.7	34.9		49.2	43.8	
Level of Service	E	B		F	A	A	D	C		D	D	
Approach Delay (s)		13.0			11.1			37.2			45.2	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM Average Control Delay	16.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
14: Main Street & Big Break Road

2010 & Proj AM
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↑↱			↰↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.97	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	1719	1647			1757	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.60	1.00			0.78	1.00
Satd. Flow (perm)	1719	3438	1538	1719	3438	1538	1086	1647			1417	1538
Volume (vph)	81	805	30	50	1203	60	60	20	30	60	40	210
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	90	894	33	56	1337	67	67	22	33	67	44	233
RTOR Reduction (vph)	0	0	11	0	0	24	0	29	0	0	0	202
Lane Group Flow (vph)	90	894	22	56	1337	43	67	26	0	0	111	31
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot		custom	Prot		custom	Perm			Perm		Perm
Protected Phases	5			1				3			7	
Permitted Phases		2	2		6	6	3			7		7
Actuated Green, G (s)	11.2	66.8	66.8	6.7	62.3	62.3	12.5	12.5			12.5	12.5
Effective Green, g (s)	11.2	67.8	67.8	6.7	63.3	63.3	13.5	13.5			13.5	13.5
Actuated g/C Ratio	0.11	0.68	0.68	0.07	0.63	0.63	0.14	0.14			0.14	0.14
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0	5.0	5.0	5.0			5.0	5.0
Vehicle Extension (s)	3.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)	193	2331	1043	115	2176	974	147	222			191	208
v/s Ratio Prot	0.05			0.03				0.02				
v/s Ratio Perm		c0.26	0.01		c0.39	0.03	0.06				c0.08	0.02
v/c Ratio	0.47	0.38	0.02	0.49	0.61	0.04	0.46	0.12			0.58	0.15
Uniform Delay, d1	41.6	7.0	5.3	45.0	11.0	6.9	39.9	38.0			40.6	38.2
Progression Factor	0.85	0.43	0.04	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	1.7	0.5	0.0	1.2	1.3	0.1	0.8	0.1			2.9	0.1
Delay (s)	37.1	3.5	0.3	46.2	12.3	7.0	40.7	38.1			43.5	38.3
Level of Service	D	A	A	D	B	A	D	D			D	D
Approach Delay (s)		6.3			13.4			39.5			40.0	
Approach LOS		A			B			D			D	

Intersection Summary			
HCM Average Control Delay	15.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
15: Oakley Road & Neroly Road

2010 & Proj AM
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	37	20	10	76	113	60	286	20	53	151	10
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	11	41	22	11	84	124	66	314	22	58	166	11

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	74	219	402	235
Volume Left (vph)	11	11	66	58
Volume Right (vph)	22	124	22	11
Hadj (s)	-0.12	-0.30	0.03	0.06
Departure Headway (s)	5.9	5.4	5.1	5.4
Degree Utilization, x	0.12	0.33	0.58	0.35
Capacity (veh/h)	506	597	665	621
Control Delay (s)	9.7	11.1	14.9	11.3
Approach Delay (s)	9.7	11.1	14.9	11.3
Approach LOS	A	B	B	B

Intersection Summary			
Delay	12.7		
HCM Level of Service	B		
Intersection Capacity Utilization	42.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
16: Oakley Road & Live Oak Ave

2010 & Proj AM
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	13	70	10	50	140	63	40	196	20	45	141	12
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	14	78	11	56	156	70	44	218	22	50	157	13

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	103	281	284	220
Volume Left (vph)	14	56	44	50
Volume Right (vph)	11	70	22	13
Hadj (s)	0.00	-0.08	0.02	0.04
Departure Headway (s)	5.8	5.4	5.4	5.5
Degree Utilization, x	0.17	0.42	0.43	0.34
Capacity (veh/h)	539	616	618	601
Control Delay (s)	10.0	12.3	12.3	11.3
Approach Delay (s)	10.0	12.3	12.3	11.3
Approach LOS	A	B	B	B

Intersection Summary			
Delay	11.8		
HCM Level of Service	B		
Intersection Capacity Utilization	43.9%	ICU Level of Service	A
Analysis Period (min)	15		

17: Oakley Road & Empire Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↑	↱		↰↑	↱	↰	↑↑↱		↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95		1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1708	1583		1803	1583	1770	3523		1770	1863	1583
Flt Permitted	0.95	0.97	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1708	1583		1803	1583	1770	3523		1770	1863	1583
Volume (vph)	60	10	145	20	10	20	213	314	10	40	237	60
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	11	158	22	11	22	232	341	11	43	258	65
RTOR Reduction (vph)	0	0	145	0	0	20	0	2	0	0	0	39
Lane Group Flow (vph)	37	39	13	0	33	2	232	350	0	43	258	26
Turn Type	Split		Perm	Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8						6
Actuated Green, G (s)	4.8	4.8	4.8		3.9	3.9	9.5	30.5		1.7	22.7	22.7
Effective Green, g (s)	4.8	4.8	4.8		4.9	4.9	10.5	31.5		2.7	23.7	23.7
Actuated g/C Ratio	0.08	0.08	0.08		0.08	0.08	0.18	0.53		0.05	0.40	0.40
Clearance Time (s)	4.0	4.0	4.0		5.0	5.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	135	137	127		147	129	310	1853		80	737	626
v/s Ratio Prot	0.02	c0.02			c0.02		c0.13	0.10		0.02	c0.14	
v/s Ratio Perm			0.01			0.00						0.02
v/c Ratio	0.27	0.28	0.10		0.22	0.01	0.75	0.19		0.54	0.35	0.04
Uniform Delay, d1	25.9	25.9	25.5		25.7	25.3	23.4	7.5		28.0	12.7	11.1
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.1	1.1	0.3		0.8	0.0	9.5	0.0		6.8	0.3	0.0
Delay (s)	27.0	27.1	25.9		26.5	25.3	32.9	7.5		34.8	13.0	11.1
Level of Service	C	C	C		C	C	C	A		C	B	B
Approach Delay (s)		26.3			26.0			17.6			15.2	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	18.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	59.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	42.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

18: Main Street & Charles Way

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑↱		↰↰	↑	↱		↰↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.99	1.00
Satd. Flow (prot)	1719	3539	1538	1770	3534		3335	1810	1583		1799	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.99	1.00
Satd. Flow (perm)	1719	3539	1538	1770	3534		3335	1810	1583		1799	1538
Volume (vph)	20	718	157	130	923	10	284	10	100	20	50	40
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	22	798	174	144	1026	11	316	11	111	22	56	44
RTOR Reduction (vph)	0	0	108	0	1	0	0	0	88	0	0	42
Lane Group Flow (vph)	22	798	66	144	1036	0	316	11	23	0	78	2
Heavy Vehicles (%)	5%	2%	5%	2%	2%	2%	5%	5%	2%	2%	5%	5%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	0.7	21.6	21.6	5.0	25.9		11.1	11.1	11.1		2.9	2.9
Effective Green, g (s)	1.7	22.6	22.6	6.0	26.9		12.1	12.1	12.1		2.9	2.9
Actuated g/C Ratio	0.03	0.38	0.38	0.10	0.45		0.20	0.20	0.20		0.05	0.05
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	49	1342	583	178	1595		677	367	321		88	75
v/s Ratio Prot	0.01	0.23		c0.08	c0.29		c0.09	0.01			c0.04	
v/s Ratio Perm			0.04						0.01			0.00
v/c Ratio	0.45	0.59	0.11	0.81	0.65		0.47	0.03	0.07		0.89	0.03
Uniform Delay, d1	28.5	14.8	12.0	26.2	12.7		20.9	19.0	19.2		28.2	27.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	6.4	0.7	0.1	23.0	0.9		0.5	0.0	0.1		59.6	0.2
Delay (s)	34.9	15.5	12.1	49.2	13.6		21.4	19.1	19.3		87.7	27.2
Level of Service	C	B	B	D	B		C	B	B		F	C
Approach Delay (s)		15.4			18.0			20.8			65.9	
Approach LOS		B			B			C			E	

Intersection Summary			
HCM Average Control Delay	19.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	59.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

19: Main Street & Vintage Parkway

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑	↑↑↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3485		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3539	3485		1770	1583
Volume (vph)	76	742	886	100	180	157
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	84	824	984	111	200	174
RTOR Reduction (vph)	0	0	11	0	0	136
Lane Group Flow (vph)	84	824	1084	0	200	38
Turn Type	Prot					Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	2.8	29.2	22.4		10.8	10.8
Effective Green, g (s)	2.8	30.2	23.4		10.8	10.8
Actuated g/C Ratio	0.06	0.62	0.48		0.22	0.22
Clearance Time (s)	4.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	101	2181	1664		390	349
v/s Ratio Prot	c0.05	0.23	c0.31		c0.11	
v/s Ratio Perm						0.02
v/c Ratio	0.83	0.38	0.65		0.51	0.11
Uniform Delay, d1	22.9	4.7	9.7		16.8	15.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	41.4	0.1	0.9		1.1	0.1
Delay (s)	64.3	4.8	10.6		17.9	15.4
Level of Service	E	A	B		B	B
Approach Delay (s)		10.3	10.6		16.8	
Approach LOS		B	B		B	

Intersection Summary			
HCM Average Control Delay	11.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	49.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

20: Main Street & O'Hara Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑↱			↰↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85			0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1770	1863	1583	1770	1861		1770	1583			1695	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.75	1.00			0.91	
Satd. Flow (perm)	1770	1863	1583	1770	1861		1399	1583			1580	
Volume (vph)	5	754	118	30	854	5	122	0	30	5	0	5
Peak-hour factor, PHF	0.92	0.90	0.90	0.90	0.90	0.92	0.90	0.92	0.90	0.92	0.92	0.92
Adj. Flow (vph)	5	838	131	33	949	5	136	0	33	5	0	5
RTOR Reduction (vph)	0	0	44	0	0	0	0	28	0	0	4	0
Lane Group Flow (vph)	5	838	87	33	954	0	136	5	0	0	6	0
Turn Type	Prot		Perm	Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4				2			6		
Actuated Green, G (s)	0.9	50.1	50.1	1.8	51.0		11.8	11.8			12.3	
Effective Green, g (s)	0.9	51.1	51.1	1.8	52.0		12.3	12.3			12.3	
Actuated g/C Ratio	0.01	0.66	0.66	0.02	0.67		0.16	0.16			0.16	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		4.5	4.5			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	21	1233	1048	41	1254		223	252			252	
v/s Ratio Prot	0.00	0.45		c0.02	c0.51			0.00				
v/s Ratio Perm			0.05				c0.10				0.00	
v/c Ratio	0.24	0.68	0.08	0.80	0.76		0.61	0.02			0.02	
Uniform Delay, d1	37.8	8.0	4.7	37.5	8.4		30.2	27.4			27.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	5.8	1.5	0.0	69.0	2.8		4.7	0.0			0.0	
Delay (s)	43.6	9.5	4.7	106.5	11.2		34.9	27.4			27.4	
Level of Service	D	A	A	F	B		C	C			C	
Approach Delay (s)		9.1			14.4			33.4			27.4	
Approach LOS		A			B			C			C	

Intersection Summary			
HCM Average Control Delay	13.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	77.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
21: Cypress Road & Empire Avenue

2010 & Proj AM
11/6/2006

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↱		↰	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.96		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3406		1770	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	3406		1770	3539
Volume (vph)	150	201	297	100	114	308
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	167	223	330	111	127	342
RTOR Reduction (vph)	0	176	50	0	0	0
Lane Group Flow (vph)	167	47	391	0	127	342
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	8.8	8.8	16.9		4.6	25.5
Effective Green, g (s)	9.3	9.3	17.9		4.6	26.5
Actuated g/C Ratio	0.21	0.21	0.41		0.11	0.61
Clearance Time (s)	4.5	4.5	5.0		4.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	376	336	1392		186	2141
v/s Ratio Prot	c0.09		c0.11		c0.07	0.10
v/s Ratio Perm		0.03				
v/c Ratio	0.44	0.14	0.28		0.68	0.16
Uniform Delay, d1	15.0	14.0	8.7		18.9	3.8
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.8	0.2	0.1		9.9	0.0
Delay (s)	15.8	14.2	8.8		28.8	3.8
Level of Service	B	B	A		C	A
Approach Delay (s)	14.9		8.8			10.6
Approach LOS	B		A			B

Intersection Summary			
HCM Average Control Delay	11.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	43.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	36.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
22: Cypress Road & Main Street

2010 & Proj AM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↱	↱	↰	↑↑	↱	↰↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	0.95	1.00	0.95	1.00	0.97	0.95	
Frt	1.00	0.95		1.00	0.94	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3370		1770	1669	1504	1770	3539	1583	3433	3527	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3370		1770	1669	1504	1770	3539	1583	3433	3527	
Volume (vph)	40	129	60	100	150	380	30	454	110	354	410	10
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	44	143	67	111	167	422	33	504	122	393	456	11
RTOR Reduction (vph)	0	52	0	0	30	236	0	0	88	0	2	0
Lane Group Flow (vph)	44	158	0	111	239	84	33	504	34	393	465	0
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			
Actuated Green, G (s)	1.9	13.5		4.5	16.1	16.1	1.6	17.2	17.2	10.3	25.9	
Effective Green, g (s)	1.9	13.5		4.5	16.1	16.1	1.6	17.2	17.2	10.3	25.9	
Actuated g/C Ratio	0.03	0.22		0.07	0.26	0.26	0.03	0.28	0.28	0.17	0.42	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	55	740		130	437	394	46	990	443	575	1485	
v/s Ratio Prot	0.02	0.05		c0.06	c0.14		0.02	c0.14		c0.11	0.13	
v/s Ratio Perm						0.06			0.02			
v/c Ratio	0.80	0.21		0.85	0.55	0.21	0.72	0.51	0.08	0.68	0.31	
Uniform Delay, d1	29.6	19.7		28.2	19.6	17.7	29.7	18.6	16.3	24.1	11.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	55.2	0.1		38.7	1.4	0.3	41.5	0.4	0.1	3.4	0.1	
Delay (s)	84.8	19.8		66.9	21.0	18.0	71.2	19.0	16.4	27.4	12.0	
Level of Service	F	B		E	C	B	E	B	B	C	B	
Approach Delay (s)		31.1			26.9			21.1			19.0	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	23.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	61.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	55.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
23: Neroly Road & Live Oak Ave

2010 & Proj AM
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↱			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	30	191	75	70	213	117	107	146	50	169	62	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	208	82	76	232	127	116	159	54	184	67	22

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	136	185	192	243	329	273
Volume Left (vph)	33	0	76	0	116	184
Volume Right (vph)	0	82	0	127	54	22
Hadj (s)	0.15	-0.27	0.23	-0.33	0.01	0.12
Departure Headway (s)	7.8	7.3	7.6	7.1	6.9	7.1
Degree Utilization, x	0.29	0.38	0.41	0.48	0.63	0.54
Capacity (veh/h)	427	445	444	473	493	461
Control Delay (s)	12.8	13.5	14.6	15.1	20.8	18.2
Approach Delay (s)	13.2		14.9		20.8	18.2
Approach LOS	B		B		C	C

Intersection Summary			
Delay	16.6		
HCM Level of Service	C		
Intersection Capacity Utilization	55.3%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
24: Laurel Road & Live Oak Avenue

2010 & Proj AM
11/6/2006

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰↰	↑↑↑	↑↑↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	0.91	0.91		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3433	5085	5017		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	3433	5085	5017		1770	1583
Volume (vph)	312	620	900	88	105	305
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	339	674	978	96	114	332
RTOR Reduction (vph)	0	0	16	0	0	188
Lane Group Flow (vph)	339	674	1058	0	114	144
Turn Type	Prot					Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	5.1	24.4	15.3		9.3	9.3
Effective Green, g (s)	5.1	25.4	16.3		10.3	10.3
Actuated g/C Ratio	0.12	0.58	0.37		0.24	0.24
Clearance Time (s)	4.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	401	2956	1871		417	373
v/s Ratio Prot	c0.10	0.13	c0.21		0.06	
v/s Ratio Perm						c0.09
v/c Ratio	0.85	0.23	0.57		0.27	0.39
Uniform Delay, d1	18.9	4.4	10.9		13.6	14.0
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	15.0	0.0	0.4		0.4	0.7
Delay (s)	33.9	4.5	11.3		14.0	14.7
Level of Service	C	A	B		B	B
Approach Delay (s)		14.3	11.3		14.5	
Approach LOS		B	B		B	

Intersection Summary			
HCM Average Control Delay	13.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	43.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	44.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

25: Laurel Road & Empire Avenue

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.99		1.00	0.97		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3396		1770	3510		1770	3431		1770	3284	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3396		1770	3510		1770	3431		1770	3284	
Volume (vph)	170	405	150	50	708	41	60	116	30	51	238	220
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	189	450	167	56	787	46	67	129	33	57	264	244
RTOR Reduction (vph)	0	53	0	0	7	0	0	27	0	0	199	0
Lane Group Flow (vph)	189	564	0	56	826	0	67	135	0	57	309	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	8.0	21.9		3.2	17.1		2.1	9.7		2.1	9.7	
Effective Green, g (s)	8.0	21.9		3.2	17.1		2.1	9.7		2.1	9.7	
Actuated g/C Ratio	0.15	0.41		0.06	0.32		0.04	0.18		0.04	0.18	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	268	1406		107	1135		70	629		70	602	
v/s Ratio Prot	c0.11	0.17		0.03	c0.24		c0.04	0.04		0.03	c0.09	
v/s Ratio Perm												
v/c Ratio	0.71	0.40		0.52	0.73		0.96	0.21		0.81	0.51	
Uniform Delay, d1	21.3	10.9		24.1	15.8		25.4	18.4		25.2	19.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.2	0.2		4.6	2.4		91.8	0.2		49.3	0.7	
Delay (s)	29.5	11.1		28.7	18.2		117.1	18.5		74.5	20.2	
Level of Service	C	B		C	B		F	B		E	C	
Approach Delay (s)		15.4			18.9			47.4			25.7	
Approach LOS		B			B			D			C	

Intersection Summary			
HCM Average Control Delay	21.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	52.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

26: Proj Dwy & Bridgehead Road

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑	↱	↰	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	1863	1583	1770	1863
Volume (vph)	64	39	512	77	48	245
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	70	42	557	84	52	266
RTOR Reduction (vph)	0	38	0	28	0	0
Lane Group Flow (vph)	70	4	557	56	52	266
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	6.6	6.6	41.8	41.8	2.4	48.2
Effective Green, g (s)	6.6	6.6	42.8	42.8	2.4	49.2
Actuated g/C Ratio	0.10	0.10	0.67	0.67	0.04	0.77
Clearance Time (s)	4.0	4.0	5.0	5.0	4.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	183	164	1250	1062	67	1437
v/s Ratio Prot	c0.04		c0.30		c0.03	0.14
v/s Ratio Perm		0.00		0.04		
v/c Ratio	0.38	0.03	0.45	0.05	0.78	0.19
Uniform Delay, d1	26.7	25.7	4.9	3.6	30.4	1.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	0.1	0.3	0.0	42.0	0.1
Delay (s)	28.0	25.8	5.2	3.6	72.4	2.0
Level of Service	C	C	A	A	E	A
Approach Delay (s)	27.2		5.0			13.5
Approach LOS	C		A			B

Intersection Summary			
HCM Average Control Delay	9.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	63.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

27: Main Street & Proj Dwy Center

	↗	→	←	↖	↘	↙
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑	↑↑	↱	↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3539	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	3539	3539	1583	1770	1583
Volume (vph)	29	858	1459	58	48	24
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	933	1586	63	52	26
RTOR Reduction (vph)	0	0	0	16	0	24
Lane Group Flow (vph)	32	933	1586	47	52	2
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	5.0	83.9	74.4	74.4	7.1	7.1
Effective Green, g (s)	5.5	84.4	74.9	74.9	7.6	7.6
Actuated g/C Ratio	0.06	0.84	0.75	0.75	0.08	0.08
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	97	2987	2651	1186	135	120
v/s Ratio Prot	0.02	c0.26	c0.45		c0.03	
v/s Ratio Perm				0.03		0.00
v/c Ratio	0.33	0.31	0.60	0.04	0.39	0.02
Uniform Delay, d1	45.5	1.7	5.7	3.2	44.0	42.7
Progression Factor	1.08	1.14	0.17	0.07	1.00	1.00
Incremental Delay, d2	1.9	0.3	0.7	0.0	1.8	0.1
Delay (s)	51.1	2.1	1.7	0.3	45.8	42.8
Level of Service	D	A	A	A	D	D
Approach Delay (s)		3.8	1.6		44.8	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	3.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

28: Main Street & Proj Dwy East

	↗	→	←	↖	↘	↙
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑	↑↑	↱	↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3539	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	3539	3539	1583	1770	1583
Volume (vph)	32	851	1435	38	25	32
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	35	925	1560	41	27	35
RTOR Reduction (vph)	0	0	0	9	0	33
Lane Group Flow (vph)	35	925	1560	32	27	2
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		7	
Permitted Phases				6		7
Actuated Green, G (s)	4.9	86.3	76.4	76.4	4.7	4.7
Effective Green, g (s)	5.4	86.8	77.4	77.4	5.2	5.2
Actuated g/C Ratio	0.05	0.87	0.77	0.77	0.05	0.05
Clearance Time (s)	4.5	4.5	5.0	5.0	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	96	3072	2739	1225	92	82
v/s Ratio Prot	0.02	c0.26	c0.44		c0.02	
v/s Ratio Perm				0.02		0.00
v/c Ratio	0.36	0.30	0.57	0.03	0.29	0.02
Uniform Delay, d1	45.6	1.2	4.6	2.6	45.6	45.0
Progression Factor	1.13	0.27	0.36	0.21	1.00	1.00
Incremental Delay, d2	2.2	0.2	0.7	0.0	1.8	0.1
Delay (s)	53.8	0.6	2.4	0.6	47.4	45.1
Level of Service	D	A	A	A	D	D
Approach Delay (s)		2.5	2.3		46.1	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	3.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↱	↰	↑	↰↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1583	1770	1863	3433	1583
Flt Permitted	1.00	1.00	0.74	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	1384	1863	3433	1583
Volume (vph)	20	168	51	20	214	62
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	183	55	22	233	67
RTOR Reduction (vph)	0	140	0	0	0	33
Lane Group Flow (vph)	22	43	55	22	233	34
Turn Type		Perm	Perm			custom
Protected Phases	4			8		
Permitted Phases		4	8		2	2
Actuated Green, G (s)	7.1	7.1	7.1	7.1	15.4	15.4
Effective Green, g (s)	7.1	7.1	7.1	7.1	15.4	15.4
Actuated g/C Ratio	0.23	0.23	0.23	0.23	0.50	0.50
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	434	369	322	434	1733	799
v/s Ratio Prot	0.01			0.01		
v/s Ratio Perm		0.03	c0.04		c0.07	0.02
v/c Ratio	0.05	0.12	0.17	0.05	0.13	0.04
Uniform Delay, d1	9.1	9.2	9.3	9.1	4.0	3.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	0.1	0.3	0.0	0.0	0.0
Delay (s)	9.1	9.4	9.6	9.1	4.0	3.8
Level of Service	A	A	A	A	A	A
Approach Delay (s)	9.3			9.5	4.0	
Approach LOS	A			A	A	

Intersection Summary			
HCM Average Control Delay	6.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.15		
Actuated Cycle Length (s)	30.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	22.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
=========================================================================
Condition: 2010 Plus Project                                    11/03/06
=========================================================================
INTERSECTION     1 Minaker/Wilbur                   Oakley
Count Date                      Time                Peak Hour PM
-------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                        5-PHASE SIGNAL
-----------            20    5   10
                        |    |    |
            ^           |    |    |          ^
            |         <---   v   --->        | Split? N
LEFT    20 ---  1.0    1.0  1.1  1.1    1.1 ---   10  RIGHT
                                                           STREET NAME:
THRU   120 ---> 2.1  (NO. OF LANES)    2.1<---  496  THRU  Wilbur

RIGHT   40 ---  1.1    1.1  1.1  1.0    1.0 ---   10  LEFT
            |         <---   ^   --->        |
            v           |    |    |          v
  N                     |    |    |                      SIG WARRANTS:
W + E                  140    5   20                      Urb=N, Rur=N
  S                   LEFT THRU RIGHT Split? N

               STREET NAME: Minaker
=========================================================================
                ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT      VOLUME     VOLUME*   CAPACITY    RATIO       V/C
-------------------------------------------------------------------------
NB  RIGHT (R)      20          10 *     1650     0.0061
    THRU (T)        5           5       1650     0.0030
    LEFT (L)      140         140       1650     0.0848
    T + L                     145       1650     0.0879     0.0879
-------------------------------------------------------------------------
SB  RIGHT (R)      20           0 *     1650     0.0000
    THRU (T)        5           5       1650     0.0030
    LEFT (L)       10          10       1650     0.0061     0.0061
    T + L                      15       1650     0.0091
-------------------------------------------------------------------------
EB  RIGHT (R)      40          40       1650     0.0242
    THRU (T)      120         120       3300     0.0364
    LEFT (L)       20          20       1650     0.0121     0.0121
    T + R                     160       3300     0.0485
-------------------------------------------------------------------------
WB  RIGHT (R)      10          10       1650     0.0061
    THRU (T)      496         496       3300     0.1503
    LEFT (L)       10          10       1650     0.0061
    T + R                     506       3300     0.1533     0.1533
=========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                          0.26
     INTERSECTION LEVEL OF SERVICE:                              A
=========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
=========================================================================
Condition: 2010 Plus Project                                    11/03/06
=========================================================================
INTERSECTION     6 Hillcrest/18th St                Oakley
Count Date                      Time                Peak Hour AM
-------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                        6-PHASE SIGNAL
-----------            40   70   40
                        |    |    |
            ^           |    |    |          ^
            |         <---   v   --->        | Split? N
LEFT    10 ---  1.0    1.0  1.0  1.0    1.1 ---   30  RIGHT
                                                           STREET NAME:
THRU   160 ---> 2.1  (NO. OF LANES)    2.1<---  366  THRU  18th St

RIGHT   70 ---  1.1    1.0  1.0  1.0    1.0 ---  196  LEFT
            |         <---   ^   --->        |
            v           |    |    |          v
  N                     |    |    |                      SIG WARRANTS:
W + E                  190  100  160                      Urb=B, Rur=Y
  S                   LEFT THRU RIGHT Split? Y

               STREET NAME: Hillcrest
=========================================================================
                ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT      VOLUME     VOLUME*   CAPACITY    RATIO       V/C
-------------------------------------------------------------------------
NB  RIGHT (R)     160           0 *     1650     0.0000
    THRU (T)      100         100       1650     0.0606
    LEFT (L)      190         190       1650     0.1152     0.1152
-------------------------------------------------------------------------
SB  RIGHT (R)      40          30 *     1650     0.0182
    THRU (T)       70          70       1650     0.0424     0.0424
    LEFT (L)       40          40       1650     0.0242
-------------------------------------------------------------------------
EB  RIGHT (R)      70          70       1650     0.0424
    THRU (T)      160         160       3300     0.0485
    LEFT (L)       10          10       1650     0.0061
    T + R                     230       3300     0.0697     0.0697
-------------------------------------------------------------------------
WB  RIGHT (R)      30          30       1650     0.0182
    THRU (T)      366         366       3300     0.1109
    LEFT (L)      196         196       1650     0.1188     0.1188
    T + R                     396       3300     0.1200
=========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                          0.35
     INTERSECTION LEVEL OF SERVICE:                              A
=========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
=========================================================================
Condition: 2010 Plus Project                                    11/03/06
=========================================================================
INTERSECTION     7 Viera/18th St                    Oakley
Count Date                      Time                Peak Hour AM
-------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                        2-PHASE SIGNAL
-----------            50   20   18
                        |    |    |
            ^           |    |    |          ^
            |         <---   v   --->        | Split? N
LEFT    70 ---  1.0    1.1  1.1  1.1    1.1 ---  136  RIGHT
                                                           STREET NAME:
THRU   235 ---> 2.0  (NO. OF LANES)    1.1<---  387  THRU  18th St

RIGHT   40 ---  1.0    1.1  1.1  1.0    1.0 ---   10  LEFT
            |         <---   ^   --->        |
            v           |    |    |          v
  N                     |    |    |                      SIG WARRANTS:
W + E                  120   30   10                      Urb=N, Rur=N
  S                   LEFT THRU RIGHT Split? N

               STREET NAME: Viera
=========================================================================
                ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT      VOLUME     VOLUME*   CAPACITY    RATIO       V/C
-------------------------------------------------------------------------
NB  RIGHT (R)      10           0 *     1800     0.0000
    THRU (T)       30          30       1800     0.0167
    LEFT (L)      120         120       1800     0.0667     0.0667
    T + L                     150       1800     0.0833
-------------------------------------------------------------------------
SB  RIGHT (R)      50          50       1800     0.0278
    THRU (T)       20          20       1800     0.0111
    LEFT (L)       18          18       1800     0.0100
    T + R                      70       1800     0.0389
    T + L                      38       1800     0.0211
    T + R + L                  88       1800     0.0489     0.0489
-------------------------------------------------------------------------
EB  RIGHT (R)      40           0 *     1800     0.0000
    THRU (T)      235         235       3600     0.0653
    LEFT (L)       70          70       1800     0.0389     0.0389
-------------------------------------------------------------------------
WB  RIGHT (R)     136         136       1800     0.0756
    THRU (T)      387         387       1800     0.2150
    LEFT (L)       10          10       1800     0.0056
    T + R                     523       1800     0.2906     0.2906
=========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                          0.45
     INTERSECTION LEVEL OF SERVICE:                              A
=========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
=========================================================================
Condition: 2010 Plus Project                                    11/03/06
=========================================================================
INTERSECTION     8 Phillips Lane/18th Street        Oakley
Count Date                      Time                Peak Hour AM
-------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                        6-PHASE SIGNAL
-----------            30   10   20
                        |    |    |
            ^           |    |    |          ^
            |         <---   v   --->        | Split? N
LEFT    40 ---  1.0    1.1  1.1  2.0    1.0 ---   30  RIGHT
                                                           STREET NAME:
THRU   282 ---> 2.1  (NO. OF LANES)    2.0<---  529  THRU  18th Street

RIGHT    5 ---  1.1    1.0  1.1  1.1    1.0 ---   10  LEFT
            |         <---   ^   --->        |
            v           |    |    |          v
  N                     |    |    |                      SIG WARRANTS:
W + E                   10   10   10                      Urb=N, Rur=N
  S                   LEFT THRU RIGHT Split? Y

               STREET NAME: Phillips Lane
=========================================================================
                ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT      VOLUME     VOLUME*   CAPACITY    RATIO       V/C
-------------------------------------------------------------------------
NB  RIGHT (R)      10          10       1650     0.0061
    THRU (T)       10          10       1650     0.0061
    LEFT (L)       10          10       1650     0.0061
    T + R                      20       1650     0.0121     0.0121
-------------------------------------------------------------------------
SB  RIGHT (R)      30          30       1650     0.0182
    THRU (T)       10          10       1650     0.0061
    LEFT (L)       20          20       3000     0.0067
    T + R                      40       1650     0.0242     0.0242
-------------------------------------------------------------------------
EB  RIGHT (R)       5           5       1650     0.0030
    THRU (T)      282         282       3300     0.0855
    LEFT (L)       40          40       1650     0.0242     0.0242
    T + R                     287       3300     0.0870
-------------------------------------------------------------------------
WB  RIGHT (R)      30          19 *     1650     0.0115
    THRU (T)      529         529       3300     0.1603     0.1603
    LEFT (L)       10          10       1650     0.0061
=========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                          0.22
     INTERSECTION LEVEL OF SERVICE:                              A
=========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010_WP.INT,VOL=2010_WP.AM,CAP=
```

HCM Signalized Intersection Capacity Analysis
13: Main Street & Live Oak Ave

2030 AM no Ramps
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑	↱	↰	↑↑↱		↰	↑↱		↰↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91		1.00	0.95		0.97	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	4940	1538	1719	4850		1719	3433		3433	3450	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	4940	1538	1719	4850		1719	3433		3433	3450	
Volume (vph)	180	1010	110	90	1480	260	170	350	70	100	150	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	189	1063	116	95	1558	274	179	368	74	105	158	32
RTOR Reduction (vph)	0	0	62	0	23	0	0	17	0	0	18	0
Lane Group Flow (vph)	189	1063	54	95	1809	0	179	425	0	105	172	0
Heavy Vehicles (%)	2%	5%	5%	5%	5%	2%	5%	2%	5%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2		6							
Actuated Green, G (s)	12.8	45.7	45.7	10.4	43.3		15.8	20.6		6.3	10.1	
Effective Green, g (s)	12.8	46.7	46.7	10.4	44.3		16.8	20.6		6.3	10.1	
Actuated g/C Ratio	0.13	0.47	0.47	0.10	0.44		0.17	0.21		0.06	0.10	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		5.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	227	2307	718	179	2149		289	707		216	348	
v/s Ratio Prot	c0.11	0.22		0.06	c0.37		0.10	c0.12		0.03	c0.05	
v/s Ratio Perm			0.04									
v/c Ratio	0.83	0.46	0.08	0.53	0.84		0.62	0.60		0.49	0.49	
Uniform Delay, d1	42.6	18.1	14.7	42.5	24.7		38.6	36.0		45.3	42.5	
Progression Factor	1.17	0.88	1.54	0.96	0.39		1.00	1.00		1.00	1.00	
Incremental Delay, d2	21.4	0.6	0.2	2.8	4.0		3.9	1.4		1.7	1.1	
Delay (s)	71.0	16.6	22.8	43.6	13.6		42.6	37.4		47.0	43.6	
Level of Service	E	B	C	D	B		D	D		D	D	
Approach Delay (s)		24.6			15.1			38.9			44.8	
Approach LOS		C			B			D			D	

Intersection Summary			
HCM Average Control Delay	23.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
14: Main Street & Big Break Road

2030 AM no Ramps
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↱			↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.97	1.00
Satd. Flow (prot)	1770	3438	1583	1770	3438	1583	1770	1723			1799	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.50	1.00			0.76	1.00
Satd. Flow (perm)	1770	3438	1583	1770	3438	1583	932	1723			1419	1583
Volume (vph)	190	930	60	60	1570	80	90	20	20	100	40	170
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	200	979	63	63	1653	84	95	21	21	105	42	179
RTOR Reduction (vph)	0	0	21	0	0	30	0	18	0	0	0	153
Lane Group Flow (vph)	200	979	42	63	1653	54	95	24	0	0	147	26
Heavy Vehicles (%)	2%	5%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot		custom	Prot		custom	Perm			Perm		Perm
Protected Phases	5			1				3			7	
Permitted Phases		2	2		6	6	3			7		7
Actuated Green, G (s)	16.8	65.9	65.9	6.5	55.6	55.6	13.6	13.6			13.6	13.6
Effective Green, g (s)	16.8	66.9	66.9	6.5	56.6	56.6	14.6	14.6			14.6	14.6
Actuated g/C Ratio	0.17	0.67	0.67	0.06	0.57	0.57	0.15	0.15			0.15	0.15
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0	5.0	5.0	5.0			5.0	5.0
Vehicle Extension (s)	3.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)	297	2300	1059	115	1946	896	136	252			207	231
v/s Ratio Prot	c0.11			0.04				0.01				
v/s Ratio Perm		0.28	0.03		c0.48	0.03	0.10				c0.10	0.02
v/c Ratio	0.67	0.43	0.04	0.55	0.85	0.06	0.70	0.10			0.71	0.11
Uniform Delay, d1	39.0	7.7	5.6	45.3	18.1	9.7	40.6	37.0			40.7	37.1
Progression Factor	0.83	0.33	0.19	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	5.8	0.6	0.1	2.8	4.9	0.1	11.9	0.1			9.2	0.1
Delay (s)	38.1	3.1	1.1	48.2	23.0	9.9	52.5	37.0			49.8	37.2
Level of Service	D	A	A	D	C	A	D	D			D	D
Approach Delay (s)		8.6			23.3			47.8			42.9	
Approach LOS		A			C			D			D	

Intersection Summary			
HCM Average Control Delay	20.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
15: Oakley Road & Neroly Road

2030 AM no Ramps
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	20	70	30	20	220	150	200	390	20	90	340	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	74	32	21	232	158	211	411	21	95	358	21

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	126	411	642	474
Volume Left (vph)	21	21	211	95
Volume Right (vph)	32	158	21	21
Hadj (s)	-0.08	-0.19	0.08	0.05
Departure Headway (s)	9.1	7.6	7.7	7.6
Degree Utilization, x	0.32	0.87	1.38	0.99
Capacity (veh/h)	376	467	478	474
Control Delay (s)	16.4	43.0	204.4	67.5
Approach Delay (s)	16.4	43.0	204.4	67.5
Approach LOS	C	E	F	F

Intersection Summary			
Delay	110.7		
HCM Level of Service	F		
Intersection Capacity Utilization	84.6%	ICU Level of Service	E
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
16: Oakley Road & Live Oak Ave

2030 AM no Ramps
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	20	160	20	70	280	170	50	380	50	80	190	30
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	168	21	74	295	179	53	400	53	84	200	32

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	211	547	505	316
Volume Left (vph)	21	74	53	84
Volume Right (vph)	21	179	53	32
Hadj (s)	-0.01	-0.14	-0.01	0.03
Departure Headway (s)	8.9	7.7	7.8	8.3
Degree Utilization, x	0.52	1.17	1.09	0.73
Capacity (veh/h)	382	464	473	421
Control Delay (s)	21.0	121.3	97.2	30.9
Approach Delay (s)	21.0	121.3	97.2	30.9
Approach LOS	C	F	F	D

Intersection Summary			
Delay	82.1		
HCM Level of Service	F		
Intersection Capacity Utilization	81.2%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis

17: Oakley Road & Empire Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↑	↱		↰↑	↱	↰	↑↑↱		↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95		1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1696	1583		1804	1583	1770	3523		1770	1863	1583
Flt Permitted	0.95	0.96	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1696	1583		1804	1583	1770	3523		1770	1863	1583
Volume (vph)	140	10	190	20	10	20	390	650	20	50	390	110
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	147	11	200	21	11	21	411	684	21	53	411	116
RTOR Reduction (vph)	0	0	181	0	0	20	0	2	0	0	0	79
Lane Group Flow (vph)	77	81	19	0	32	1	411	703	0	53	411	37
Turn Type	Split		Perm	Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8						6
Actuated Green, G (s)	6.5	6.5	6.5		3.9	3.9	19.2	38.0		2.5	21.3	21.3
Effective Green, g (s)	6.5	6.5	6.5		4.9	4.9	20.2	39.0		3.5	22.3	22.3
Actuated g/C Ratio	0.09	0.09	0.09		0.07	0.07	0.29	0.56		0.05	0.32	0.32
Clearance Time (s)	4.0	4.0	4.0		5.0	5.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	156	158	147		126	111	512	1966		89	594	505
v/s Ratio Prot	0.05	c0.05			c0.02		c0.23	0.20		0.03	c0.22	
v/s Ratio Perm			0.01			0.00						0.02
v/c Ratio	0.49	0.51	0.13		0.25	0.01	0.80	0.36		0.60	0.69	0.07
Uniform Delay, d1	30.1	30.2	29.1		30.8	30.2	23.0	8.5		32.5	20.8	16.6
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.4	2.8	0.4		1.1	0.0	8.8	0.1		10.3	3.5	0.1
Delay (s)	32.6	33.0	29.5		31.8	30.3	31.9	8.6		42.8	24.3	16.7
Level of Service	C	C	C		C	C	C	A		D	C	B
Approach Delay (s)		30.9			31.2			17.2			24.4	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM Average Control Delay	21.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	69.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

18: Main Street & Charles Way

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑↱		↰↰	↑	↱		↰↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.98	1.00
Satd. Flow (prot)	1719	3539	1538	1770	3530		3335	1810	1583		1797	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.98	1.00
Satd. Flow (perm)	1719	3539	1538	1770	3530		3335	1810	1583		1797	1538
Volume (vph)	20	750	250	280	1180	20	530	20	260	20	40	50
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	789	263	295	1242	21	558	21	274	21	42	53
RTOR Reduction (vph)	0	0	182	0	1	0	0	0	208	0	0	51
Lane Group Flow (vph)	21	789	81	295	1262	0	558	21	66	0	63	2
Heavy Vehicles (%)	5%	2%	5%	2%	2%	2%	5%	5%	2%	2%	5%	5%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	1.4	24.3	24.3	16.1	39.0		18.7	18.7	18.7		3.6	3.6
Effective Green, g (s)	2.4	25.3	25.3	17.1	40.0		19.7	19.7	19.7		3.6	3.6
Actuated g/C Ratio	0.03	0.31	0.31	0.21	0.49		0.24	0.24	0.24		0.04	0.04
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	50	1096	476	370	1728		804	436	382		79	68
v/s Ratio Prot	0.01	0.22		c0.17	c0.36		c0.17	0.01			c0.04	
v/s Ratio Perm			0.05						0.04			0.00
v/c Ratio	0.42	0.72	0.17	0.80	0.73		0.69	0.05	0.17		0.80	0.03
Uniform Delay, d1	39.0	25.1	20.6	30.7	16.6		28.3	23.8	24.5		38.7	37.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	5.6	2.3	0.2	11.3	1.6		2.6	0.0	0.2		41.2	0.2
Delay (s)	44.6	27.3	20.7	42.0	18.2		30.9	23.8	24.8		79.8	37.6
Level of Service	D	C	C	D	B		C	C	C		E	D
Approach Delay (s)		26.1			22.7			28.7			60.5	
Approach LOS		C			C			C			E	

Intersection Summary			
HCM Average Control Delay	26.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	81.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

19: Main Street & Vintage Parkway

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑	↑↑↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3498		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3539	3498		1770	1583
Volume (vph)	90	410	480	40	60	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	432	505	42	63	32
RTOR Reduction (vph)	0	0	6	0	0	28
Lane Group Flow (vph)	95	432	541	0	63	4
Turn Type	Prot					Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	4.3	39.6	31.3		6.6	6.6
Effective Green, g (s)	4.3	40.6	32.3		6.6	6.6
Actuated g/C Ratio	0.08	0.74	0.59		0.12	0.12
Clearance Time (s)	4.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	138	2603	2047		212	189
v/s Ratio Prot	c0.05	0.12	c0.15		c0.04	
v/s Ratio Perm						0.00
v/c Ratio	0.69	0.17	0.26		0.30	0.02
Uniform Delay, d1	24.8	2.2	5.6		22.2	21.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	13.4	0.0	0.1		0.8	0.0
Delay (s)	38.2	2.2	5.7		23.0	21.5
Level of Service	D	A	A		C	C
Approach Delay (s)		8.7	5.7		22.5	
Approach LOS		A	A		C	

Intersection Summary			
HCM Average Control Delay	8.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	55.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	32.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

20: Main Street & O'Hara Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑↱			↰↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.91			0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1770	1863	1583	1770	1851		1770	1695			1826	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.71	1.00			0.94	
Satd. Flow (perm)	1770	1863	1583	1770	1851		1330	1695			1734	
Volume (vph)	10	420	80	40	450	20	110	40	60	20	90	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	442	84	42	474	21	116	42	63	21	95	11
RTOR Reduction (vph)	0	0	38	0	2	0	0	51	0	0	6	0
Lane Group Flow (vph)	11	442	46	42	493	0	116	54	0	0	121	0
Turn Type	Prot		Perm	Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4				2			6		
Actuated Green, G (s)	0.7	28.9	28.9	1.5	29.7		10.2	10.2			10.7	
Effective Green, g (s)	0.7	29.9	29.9	1.5	30.7		10.7	10.7			10.7	
Actuated g/C Ratio	0.01	0.55	0.55	0.03	0.57		0.20	0.20			0.20	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		4.5	4.5			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	23	1030	875	49	1050		263	335			343	
v/s Ratio Prot	0.01	0.24		c0.02	c0.27			0.03				
v/s Ratio Perm			0.03				c0.09				0.07	
v/c Ratio	0.48	0.43	0.05	0.86	0.47		0.44	0.16			0.35	
Uniform Delay, d1	26.5	7.1	5.6	26.2	6.9		19.1	18.0			18.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	14.8	0.3	0.0	76.5	0.3		1.2	0.2			0.6	
Delay (s)	41.4	7.4	5.6	102.7	7.2		20.3	18.2			19.3	
Level of Service	D	A	A	F	A		C	B			B	
Approach Delay (s)		7.8			14.7			19.3			19.3	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM Average Control Delay	13.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	54.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

21: Cypress Road & Empire Avenue

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↱		↰	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3476		1770	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	3476		1770	3539
Volume (vph)	210	220	880	120	120	530
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	221	232	926	126	126	558
RTOR Reduction (vph)	0	179	15	0	0	0
Lane Group Flow (vph)	221	53	1037	0	126	558
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	11.6	11.6	22.0		6.1	32.1
Effective Green, g (s)	12.1	12.1	23.0		6.1	33.1
Actuated g/C Ratio	0.23	0.23	0.43		0.11	0.62
Clearance Time (s)	4.5	4.5	5.0		4.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	403	360	1503		203	2202
v/s Ratio Prot	c0.12		c0.30		c0.07	0.16
v/s Ratio Perm		0.03				
v/c Ratio	0.55	0.15	0.69		0.62	0.25
Uniform Delay, d1	18.1	16.4	12.2		22.4	4.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.5	0.2	1.3		5.8	0.1
Delay (s)	19.7	16.6	13.6		28.2	4.6
Level of Service	B	B	B		C	A
Approach Delay (s)	18.1		13.6			8.9
Approach LOS	B		B			A

Intersection Summary			
HCM Average Control Delay	13.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	53.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

22: Cypress Road & Main Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↱	↱	↰	↑↑	↱	↰↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	0.95	1.00	0.95	1.00	0.97	0.95	
Frt	1.00	0.97		1.00	0.92	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3423		1770	1633	1504	1770	3539	1583	3433	3527	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3423		1770	1633	1504	1770	3539	1583	3433	3527	
Volume (vph)	40	180	50	380	280	1070	90	520	220	410	450	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	189	53	400	295	1126	95	547	232	432	474	11
RTOR Reduction (vph)	0	31	0	0	45	62	0	0	25	0	2	0
Lane Group Flow (vph)	42	211	0	400	563	751	95	547	207	432	483	0
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		
Protected Phases	7	4		3	8	1	5	2	3	1	6	
Permitted Phases						8			2			
Actuated Green, G (s)	2.2	10.1		19.3	27.2	38.3	6.6	17.2	36.5	11.1	21.7	
Effective Green, g (s)	2.2	10.1		19.3	27.2	38.3	6.6	17.2	36.5	11.1	21.7	
Actuated g/C Ratio	0.03	0.14		0.26	0.37	0.52	0.09	0.23	0.50	0.15	0.29	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	53	469		464	603	863	159	826	870	517	1038	
v/s Ratio Prot	0.02	0.06		c0.23	c0.34	c0.13	0.05	c0.15	0.06	0.13	0.14	
v/s Ratio Perm						0.37			0.07			
v/c Ratio	0.79	0.45		0.86	0.93	0.87	0.60	0.66	0.24	0.84	0.47	
Uniform Delay, d1	35.5	29.2		25.9	22.4	15.5	32.3	25.6	10.6	30.4	21.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	54.5	0.7		15.1	21.7	9.5	5.9	2.0	0.1	11.2	0.3	
Delay (s)	90.1	29.9		41.1	44.1	25.0	38.2	27.6	10.8	41.6	21.6	
Level of Service	F	C		D	D	C	D	C	B	D	C	
Approach Delay (s)		38.8			34.9			24.3			31.0	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	31.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	73.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

23: Neroly Road & Live Oak Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑↱			↰↑↱			↰↑↱	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	20	260	90	120	180	240	270	180	120	150	40	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	274	95	126	189	253	284	189	126	158	42	21

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	158	232	221	347	600	221
Volume Left (vph)	21	0	126	0	284	158
Volume Right (vph)	0	95	0	253	126	21
Hadj (s)	0.10	-0.25	0.32	-0.48	0.00	0.12
Departure Headway (s)	8.5	8.2	8.5	7.7	7.5	8.4
Degree Utilization, x	0.37	0.53	0.52	0.74	1.25	0.52
Capacity (veh/h)	409	420	418	458	487	405
Control Delay (s)	15.4	18.8	19.1	28.4	153.6	20.2
Approach Delay (s)	17.4		24.8		153.6	20.2
Approach LOS	C		C		F	C

Intersection Summary			
Delay	66.0		
HCM Level of Service	F		
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		

24: Laurel Road & Live Oak Avenue

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰↰	↑↑↑	↑↑↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	0.91	0.91		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3433	5085	5005		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	3433	5085	5005		1770	1583
Volume (vph)	470	1000	1790	210	120	410
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	495	1053	1884	221	126	432
RTOR Reduction (vph)	0	0	14	0	0	238
Lane Group Flow (vph)	495	1053	2091	0	126	194
Turn Type	Prot					Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	13.1	52.5	35.4		14.1	14.1
Effective Green, g (s)	13.1	53.5	36.4		15.1	15.1
Actuated g/C Ratio	0.17	0.70	0.48		0.20	0.20
Clearance Time (s)	4.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	587	3552	2378		349	312
v/s Ratio Prot	c0.14	0.21	c0.42		0.07	
v/s Ratio Perm						c0.12
v/c Ratio	0.84	0.30	0.88		0.36	0.62
Uniform Delay, d1	30.8	4.4	18.1		26.6	28.1
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	10.7	0.0	4.1		0.6	3.8
Delay (s)	41.4	4.4	22.2		27.2	31.9
Level of Service	D	A	C		C	C
Approach Delay (s)		16.3	22.2		30.9	
Approach LOS		B	C		C	

Intersection Summary			
HCM Average Control Delay	21.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	76.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.98		1.00	0.99		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3447		1770	3454		1770	3492		1770	3214	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3447		1770	3454		1770	3492		1770	3214	
Volume (vph)	260	710	150	60	1370	260	170	510	50	50	290	460
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	274	747	158	63	1442	274	179	537	53	53	305	484
RTOR Reduction (vph)	0	13	0	0	12	0	0	5	0	0	177	0
Lane Group Flow (vph)	274	892	0	63	1704	0	179	585	0	53	612	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	19.0	71.1		7.7	59.8		12.0	32.0		4.8	24.8	
Effective Green, g (s)	19.0	71.1		7.7	59.8		12.0	32.0		4.8	24.8	
Actuated g/C Ratio	0.14	0.54		0.06	0.45		0.09	0.24		0.04	0.19	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	256	1862		104	1570		161	849		65	606	
v/s Ratio Prot	c0.15	0.26		0.04	c0.49		c0.10	0.17		0.03	c0.19	
v/s Ratio Perm												
v/c Ratio	1.07	0.48		0.61	1.09		1.11	0.69		0.82	1.01	
Uniform Delay, d1	56.3	18.8		60.5	35.9		59.8	45.3		63.0	53.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	76.1	0.2		9.6	49.7		104.1	2.3		52.3	39.1	
Delay (s)	132.4	19.0		70.1	85.6		163.9	47.6		115.2	92.5	
Level of Service	F	B		E	F		F	D		F	F	
Approach Delay (s)		45.3			85.0			74.7			93.9	
Approach LOS		D			F			E			F	

Intersection Summary			
HCM Average Control Delay	74.7	HCM Level of Service	E
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	131.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	106.2%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION     1 Minaker/Wilbur                    Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            20    5   10
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    20 ---  1.0   1.0  1.1  1.1   1.1 ---   10  RIGHT
                                                          STREET NAME:
THRU   360 ---> 2.1  (NO. OF LANES)   2.1<---  810  THRU  Wilbur

RIGHT   50 ---  1.1   1.1  1.1  1.0   1.0 ---   30  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 140    5   20                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Minaker
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      20          0 *     1650     0.0000
    THRU (T)        5          5       1650     0.0030
    LEFT (L)      140        140       1650     0.0848
    T + L                    145       1650     0.0879     0.0879
------------------------------------------------------------------------
SB  RIGHT (R)      20          0 *     1650     0.0000
    THRU (T)        5          5       1650     0.0030
    LEFT (L)       10         10       1650     0.0061     0.0061
    T + L                     15       1650     0.0091
------------------------------------------------------------------------
EB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)      360        360       3300     0.1091
    LEFT (L)       20         20       1650     0.0121     0.0121
    T + R                    410       3300     0.1242
------------------------------------------------------------------------
WB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      810        810       3300     0.2455
    LEFT (L)       30         30       1650     0.0182
    T + R                    820       3300     0.2485     0.2485
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.35
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION     6 Hillcrest/18th St                 Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            60  120   50
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    20 ---  1.0   1.0  1.0  1.0   1.1 ---   50  RIGHT
                                                          STREET NAME:
THRU   350 ---> 2.1  (NO. OF LANES)   2.1<---  490  THRU  18th St

RIGHT  100 ---  1.1   1.0  1.0  1.0   1.0 ---  240  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 230  100  200                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Hillcrest
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     200          0 *     1650     0.0000
    THRU (T)      100        100       1650     0.0606
    LEFT (L)      230        230       1650     0.1394     0.1394
------------------------------------------------------------------------
SB  RIGHT (R)      60         40 *     1650     0.0242
    THRU (T)      120        120       1650     0.0727     0.0727
    LEFT (L)       50         50       1650     0.0303
------------------------------------------------------------------------
EB  RIGHT (R)     100        100       1650     0.0606
    THRU (T)      350        350       3300     0.1061
    LEFT (L)       20         20       1650     0.0121
    T + R                    450       3300     0.1364     0.1364
------------------------------------------------------------------------
WB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)      490        490       3300     0.1485
    LEFT (L)      240        240       1650     0.1455     0.1455
    T + R                    540       3300     0.1636
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.49
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION     7 Viera/18th St                     Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       2-PHASE SIGNAL
-----------            80   20   30
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   110 ---  1.0   1.1  1.1  1.1   1.1 ---  180  RIGHT
                                                          STREET NAME:
THRU   340 ---> 2.0  (NO. OF LANES)   2.1<---  560  THRU  18th St

RIGHT   60 ---  1.0   1.1  1.1  1.0   1.0 ---   20  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 150   30   40                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Viera
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      40         20 *     1800     0.0111
    THRU (T)       30         30       1800     0.0167
    LEFT (L)      150        150       1800     0.0833     0.0833
    T + L                    180       1800     0.1000
------------------------------------------------------------------------
SB  RIGHT (R)      80         80       1800     0.0444
    THRU (T)       20         20       1800     0.0111
    LEFT (L)       30         30       1800     0.0167
    T + R                    100       1800     0.0556
    T + L                     50       1800     0.0278
    T + R + L                130       1800     0.0722     0.0722
------------------------------------------------------------------------
EB  RIGHT (R)      60          0 *     1800     0.0000
    THRU (T)      340        340       3600     0.0944
    LEFT (L)      110        110       1800     0.0611     0.0611
------------------------------------------------------------------------
WB  RIGHT (R)     180        180       1800     0.1000
    THRU (T)      560        560       3600     0.1556
    LEFT (L)       20         20       1800     0.0111
    T + R                    740       3600     0.2056     0.2056
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.42
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION     8 Phillips Lane/18th Street         Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            50   10   40
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    80 ---  1.0   1.1  1.1  2.0   1.0 ---   70  RIGHT
                                                          STREET NAME:
THRU   340 ---> 2.1  (NO. OF LANES)   2.0<---  710  THRU  18th Street

RIGHT   10 ---  1.1   1.0  1.1  1.1   1.0 ---   20  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  20   10   20                         Urb=N, Rur=B
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Phillips Lane
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)       10         10       1650     0.0061
    LEFT (L)       20         20       1650     0.0121     0.0121
    T + R                     30       1650     0.0182
------------------------------------------------------------------------
SB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)       10         10       1650     0.0061
    LEFT (L)       40         40       3000     0.0133
    T + R                     60       1650     0.0364     0.0364
------------------------------------------------------------------------
EB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      340        340       3300     0.1030
    LEFT (L)       80         80       1650     0.0485     0.0485
    T + R                    350       3300     0.1061
------------------------------------------------------------------------
WB  RIGHT (R)      70         48 *     1650     0.0291
    THRU (T)      710        710       3300     0.2152     0.2152
    LEFT (L)       20         20       1650     0.0121
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.31
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION     9 SR 160 SB Ramp/Main Street        Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            30   20   40
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    10 ---  1.0   1.1  1.1  1.0   1.0 ---   90  RIGHT
                                                          STREET NAME:
THRU   330 ---> 2.1  (NO. OF LANES)   2.0<---  630  THRU  Main Street

RIGHT   50 ---  1.1   1.1  1.1  1.9   2.0 ---  910  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 150   10  190                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 SB Ramp
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     190        190       1650     0.1152
    THRU (T)       10         10       1650     0.0061
    LEFT (L)      150        150       1650     0.0909     0.0909
    T + L                    160       1650     0.0970
------------------------------------------------------------------------
SB  RIGHT (R)      30         30       1650     0.0182
    THRU (T)       20         20       1650     0.0121
    LEFT (L)       40         40       1650     0.0242
    T + R                     50       1650     0.0303     0.0303
------------------------------------------------------------------------
EB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)      330        330       3300     0.1000
    LEFT (L)       10         10       1650     0.0061
    T + R                    380       3300     0.1152     0.1152
------------------------------------------------------------------------
WB  RIGHT (R)      90         50 *     1650     0.0303
    THRU (T)      630        630       3300     0.1909
    LEFT (L)      910        910       3000     0.3033     0.3033
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.54
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION    10 SR 160 NB Ramp/Main Street        Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0    0    0
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  RIGHT
                                                          STREET NAME:
THRU   440 ---> 3.1  (NO. OF LANES)   3.0<--- 1480  THRU  Main Street

RIGHT  120 ---  1.1   1.0  0.0  2.5   1.0 ---  140  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 150    0 1070                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 NB Ramp
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)    1070        815 *     3127     0.2606     0.2606
    LEFT (L)      150        150       1720     0.0872
------------------------------------------------------------------------
EB  RIGHT (R)     120        120       1720     0.0698
    THRU (T)      440        440       5160     0.0853
    T + R                    560       5160     0.1085
------------------------------------------------------------------------
WB  THRU (T)     1480       1480       5160     0.2868     0.2868
    LEFT (L)      140        140       1720     0.0814
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.55
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION    11 Neroly/Main Street                Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------           120  230  100
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   160 ---  1.0   1.0  1.0  2.0   1.0 ---  380  RIGHT
                                                          STREET NAME:
THRU  1150 ---> 3.1  (NO. OF LANES)   3.0<--- 1190  THRU  Main Street

RIGHT  200 ---  1.1   2.0  1.1  1.1   1.0 ---   80  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 310  210   60                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Neroly
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      60         60       1650     0.0364
    THRU (T)      210        210       1650     0.1273
    LEFT (L)      310        310       3000     0.1033
    T + R                    270       1650     0.1636     0.1636
------------------------------------------------------------------------
SB  RIGHT (R)     120          0 *     1650     0.0000
    THRU (T)      230        230       1650     0.1394     0.1394
    LEFT (L)      100        100       3000     0.0333
------------------------------------------------------------------------
EB  RIGHT (R)     200        200       1650     0.1212
    THRU (T)     1150       1150       4950     0.2323
    LEFT (L)      160        160       1650     0.0970     0.0970
    T + R                   1350       4950     0.2727
------------------------------------------------------------------------
WB  RIGHT (R)     380        325 *     1650     0.1970
    THRU (T)     1190       1190       4950     0.2404     0.2404
    LEFT (L)       80         80       1650     0.0485
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.64
     INTERSECTION LEVEL OF SERVICE:                             B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION    12 Sandy/Main Street                 Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0    0    0
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  RIGHT
                                                          STREET NAME:
THRU  1250 ---> 3.1  (NO. OF LANES)   3.0<--- 1630  THRU  Main Street

RIGHT   60 ---  1.1   1.0  0.0  1.0   1.0 ---   50  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  20    0   50                         Urb=N, Rur=N
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Sandy
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      50          0 *     1720     0.0000
    LEFT (L)       20         20       1720     0.0116     0.0116
------------------------------------------------------------------------
EB  RIGHT (R)      60         60       1720     0.0349
    THRU (T)     1250       1250       5160     0.2422
    T + R                   1310       5160     0.2539
------------------------------------------------------------------------
WB  THRU (T)     1630       1630       5160     0.3159     0.3159
    LEFT (L)       50         50       1720     0.0291
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.33
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION    13 Live Oak/Main Street              Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            30  150  100
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   180 ---  1.0   1.1  2.1  2.0   1.1 ---  260  RIGHT
                                                          STREET NAME:
THRU  1010 ---> 3.0  (NO. OF LANES)   3.1<--- 1480  THRU  Main Street

RIGHT  110 ---  1.0   1.0  2.1  1.1   1.0 ---   90  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 170  350   70                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      70         70       1650      0.0424
    THRU (T)      350        350       3300      0.1061
    LEFT (L)      170        170       1650      0.1030
    T + R                    420       3300      0.1273     0.1273
------------------------------------------------------------------------
SB  RIGHT (R)      30         30       1650      0.0182
    THRU (T)      150        150       3300      0.0455
    LEFT (L)      100        100       3000      0.0333     0.0333
    T + R                    180       3300      0.0545
------------------------------------------------------------------------
EB  RIGHT (R)     110          0 *     1650      0.0000
    THRU (T)     1010       1010       4950      0.2040
    LEFT (L)      180        180       1650      0.1091     0.1091
------------------------------------------------------------------------
WB  RIGHT (R)     260        260       1650      0.1576
    THRU (T)     1480       1480       4950      0.2990
    LEFT (L)       90         90       1650      0.0545
    T + R                   1740       4950      0.3515     0.3515
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.62
     INTERSECTION LEVEL OF SERVICE:                             B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION    14 Big Break/Main Street             Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------           170   40  100
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   190 ---  1.0   1.0  1.1  1.1   1.0 ---   80  RIGHT
                                                          STREET NAME:
THRU   930 ---> 2.0  (NO. OF LANES)   2.0<--- 1570  THRU  Main Street

RIGHT   60 ---  1.0   1.0  1.1  1.1   1.0 ---   60  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  90   20   20                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Big Break
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      20         20       1650      0.0121
    THRU (T)       20         20       1650      0.0121
    LEFT (L)       90         90       1650      0.0545     0.0545
    T + R                     40       1650      0.0242
------------------------------------------------------------------------
SB  RIGHT (R)     170          0 *     1650      0.0000
    THRU (T)       40         40       1650      0.0242
    LEFT (L)      100        100       1650      0.0606
    T + L                    140       1650      0.0848     0.0848
------------------------------------------------------------------------
EB  RIGHT (R)      60          0 *     1650      0.0000
    THRU (T)      930        930       3300      0.2818
    LEFT (L)      190        190       1650      0.1152     0.1152
------------------------------------------------------------------------
WB  RIGHT (R)      80          0 *     1650      0.0000
    THRU (T)     1570       1570       3300      0.4758     0.4758
    LEFT (L)       60         60       1650      0.0364
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.73
     INTERSECTION LEVEL OF SERVICE:                             C
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION    17 Empire Ave/Oakley Road            Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------           110  390   50
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? Y
LEFT   140 ---  2.1   1.0  1.0  1.0   1.0 ---   20  RIGHT
                                                          STREET NAME:
THRU    10 ---> 1.1  (NO. OF LANES)   1.1<---   10  THRU  Oakley Road

RIGHT  190 ---  1.0   1.0  2.1  1.1   1.1 ---   20  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 390  650   20                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire Ave
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      20         20       1650      0.0121
    THRU (T)      650        650       3300      0.1970
    LEFT (L)      390        390       1650      0.2364     0.2364
    T + R                    670       3300      0.2030
------------------------------------------------------------------------
SB  RIGHT (R)     110         33 *     1650      0.0200
    THRU (T)      390        390       1650      0.2364     0.2364
    LEFT (L)       50         50       1650      0.0303
------------------------------------------------------------------------
EB  RIGHT (R)     190          0 *     1650      0.0000
    THRU (T)       10         10       1650      0.0061
    LEFT (L)      140        140       3000      0.0467
    T + L                    150       3000      0.0500     0.0500
------------------------------------------------------------------------
WB  RIGHT (R)      20          0 *     1650      0.0000
    THRU (T)       10         10       1650      0.0061
    LEFT (L)       20         20       1650      0.0121
    T + L                     30       1650      0.0182     0.0182
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.54
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION    18 Empire Avenue/Main Street         Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------            50   40   20
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    20 ---  1.0   1.0  1.1  1.1   1.1 ---   20  RIGHT
                                                          STREET NAME:
THRU   750 ---> 2.0  (NO. OF LANES)   2.1<--- 1180  THRU  Main Street

RIGHT  250 ---  1.0   2.0  1.0  1.0   1.0 ---  260  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 530   20  260                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Empire Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     260          0 *     1650      0.0000
    THRU (T)       20         20       1650      0.0121
    LEFT (L)      530        530       3000      0.1767     0.1767
------------------------------------------------------------------------
SB  RIGHT (R)      50         30 *     1650      0.0182
    THRU (T)       40         40       1650      0.0242
    LEFT (L)       20         20       1650      0.0121
    T + L                     60       1650      0.0364     0.0364
------------------------------------------------------------------------
EB  RIGHT (R)     250          0 *     1650      0.0000
    THRU (T)      750        750       3300      0.2273     0.2273
    LEFT (L)       20         20       1650      0.0121
------------------------------------------------------------------------
WB  RIGHT (R)      20         20       1650      0.0121
    THRU (T)     1180       1180       3300      0.3576
    LEFT (L)      260        260       1650      0.1576     0.1576
    T + R                   1200       3300      0.3636
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.60
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION    19 Vintage/Main Street               Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------            30    0   60
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    90 ---  1.0   1.0  0.0  1.0   1.1 ---   40  RIGHT
                                                          STREET NAME:
THRU   410 ---> 2.0  (NO. OF LANES)   2.1<---  480  THRU  Main Street

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=N, Rur=N
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Vintage
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)      30          0 *     1720     0.0000
    LEFT (L)       60         60       1720     0.0349     0.0349
------------------------------------------------------------------------
EB  THRU (T)      410        410       3440     0.1192
    LEFT (L)       90         90       1720     0.0523     0.0523
------------------------------------------------------------------------
WB  RIGHT (R)      40         40       1720     0.0233
    THRU (T)      480        480       3440     0.1395
    T + R                    520       3440     0.1512     0.1512
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.24
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION    20 O'Hara Avenue/Main Street         Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            10   90   20
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    10 ---  1.0   1.1  1.1  1.1   1.1 ---   20  RIGHT
                                                          STREET NAME:
THRU   420 ---> 1.0  (NO. OF LANES)   1.1<---  450  THRU  Main Street

RIGHT   80 ---  1.0   1.0  1.1  1.1   1.0 ---   40  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 110   40   60                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: O'Hara Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      60         60       1650     0.0364
    THRU (T)       40         40       1650     0.0242
    LEFT (L)      110        110       1650     0.0667     0.0667
    T + R                    100       1650     0.0606
------------------------------------------------------------------------
SB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)       90         90       1650     0.0545
    LEFT (L)       20         20       1650     0.0121
    T + R                    100       1650     0.0606
    T + L                    110       1650     0.0667
    T + R + L                120       1650     0.0727     0.0727
------------------------------------------------------------------------
EB  RIGHT (R)      80          0 *     1650     0.0000
    THRU (T)      420        420       1650     0.2545
    LEFT (L)       10         10       1650     0.0061     0.0061
------------------------------------------------------------------------
WB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)      450        450       1650     0.2727
    LEFT (L)       40         40       1650     0.0242
    T + R                    470       1650     0.2848     0.2848
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.43
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION    21 Empire Avenue/Cypress Road        Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0  530  120
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  2.0  1.0   1.0 ---  220  RIGHT
                                                          STREET NAME:
THRU     0 ---> 0.0  (NO. OF LANES)   0.0<---    0  THRU  Cypress Road

RIGHT    0 ---  0.0   0.0  2.1  1.1   1.0 ---  210  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0  880  120                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     120        120       1720     0.0698
    THRU (T)      880        880       3440     0.2558
    T + R                   1000       3440     0.2907     0.2907
------------------------------------------------------------------------
SB  THRU (T)      530        530       3440     0.1541
    LEFT (L)      120        120       1720     0.0698     0.0698
------------------------------------------------------------------------
WB  RIGHT (R)     220        100 *     1720     0.0581
    LEFT (L)      210        210       1720     0.1221     0.1221
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.48
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION    22 Main Street/Cypress               Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            10  450  410
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    40 ---  1.0   1.1  2.1  2.0   2.6 --- 1070  RIGHT
                                                          STREET NAME:
THRU   180 ---> 2.1  (NO. OF LANES)   1.1<---  280  THRU  Cypress

RIGHT   50 ---  1.1   1.0  2.0  1.5   1.0 ---  380  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  90  520  220                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Main Street
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     220          0 *     1650     0.0000
    THRU (T)      520        520       3300     0.1576     0.1576
    LEFT (L)       90         90       1650     0.0545
------------------------------------------------------------------------
SB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      450        450       3300     0.1364
    LEFT (L)      410        410       3000     0.1367     0.1367
    T + R                    460       3300     0.1394
------------------------------------------------------------------------
EB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)      180        180       3300     0.0545
    LEFT (L)       40         40       1650     0.0242     0.0242
    T + R                    230       3300     0.0697
------------------------------------------------------------------------
WB  RIGHT (R)    1070        845 *     3000     0.2817
    THRU (T)      280        280       1650     0.1697
    LEFT (L)      380        380       1650     0.2303
    T + R                   1125       3000     0.3750     0.3750
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.69
     INTERSECTION LEVEL OF SERVICE:                             B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION    24 Live Oak/Laurel                   Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------           410    0  120
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   470 ---  2.0   1.0  0.0  1.0   1.1 ---  210  RIGHT
                                                          STREET NAME:
THRU  1000 ---> 3.0  (NO. OF LANES)   3.1<--- 1790  THRU  Laurel

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)     410        151 *     1720     0.0878     0.0878
    LEFT (L)      120        120       1720     0.0698
------------------------------------------------------------------------
EB  THRU (T)     1000       1000       5160     0.1938
    LEFT (L)      470        470       3127     0.1503     0.1503
------------------------------------------------------------------------
WB  RIGHT (R)     210        210       1720     0.1221
    THRU (T)     1790       1790       5160     0.3469
    T + R                   2000       5160     0.3876     0.3876
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.63
     INTERSECTION LEVEL OF SERVICE:                             B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION    25 Empire/Laurel                     Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------           460  290   50
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   260 ---  1.0   1.1  2.1  1.0   1.1 ---  260  RIGHT
                                                          STREET NAME:
THRU   710 ---> 2.1  (NO. OF LANES)   2.1<--- 1370  THRU  Laurel

RIGHT  150 ---  1.1   1.0  2.1  1.1   1.0 ---   60  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 170  510   50                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)      510        510       3300     0.1545
    LEFT (L)      170        170       1650     0.1030     0.1030
    T + R                    560       3300     0.1697
------------------------------------------------------------------------
SB  RIGHT (R)     460        460       1650     0.2788     0.2788
    THRU (T)      290        290       3300     0.0879
    LEFT (L)       50         50       1650     0.0303
    T + R                    750       3300     0.2273
------------------------------------------------------------------------
EB  RIGHT (R)     150        150       1650     0.0909
    THRU (T)      710        710       3300     0.2152
    LEFT (L)      260        260       1650     0.1576     0.1576
    T + R                    860       3300     0.2606
------------------------------------------------------------------------
WB  RIGHT (R)     260        260       1650     0.1576
    THRU (T)     1370       1370       3300     0.4152
    LEFT (L)       60         60       1650     0.0364
    T + R                   1630       3300     0.4939     0.4939
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         1.03
     INTERSECTION LEVEL OF SERVICE:                             F
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.AM,CAP=
```

Cumulative (2030) No Project PM
(Without Connector Ramps)

HCM Signalized Intersection Capacity Analysis
1: Wilbur Avenue & Minaker Drive

2030 PM no Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↱			↰↑	↱		↰↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	0.97		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (prot)	1770	3437		1770	3527			1770	1583		1817	1583
Flt Permitted	0.95	1.00		0.95	1.00			0.74	1.00		0.84	1.00
Satd. Flow (perm)	1770	3437		1770	3527			1384	1583		1565	1583
Volume (vph)	10	800	190	50	440	10	70	0	50	10	10	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	842	200	53	463	11	74	0	53	11	11	21
RTOR Reduction (vph)	0	22	0	0	2	0	0	0	47	0	0	19
Lane Group Flow (vph)	11	1020	0	53	472	0	0	74	6	0	22	2
Turn Type	Prot			Prot			Perm		Perm	Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		4
Actuated Green, G (s)	0.9	42.2		2.7	44.0			7.3	7.3		7.3	7.3
Effective Green, g (s)	0.9	42.2		2.7	44.0			7.3	7.3		7.3	7.3
Actuated g/C Ratio	0.01	0.66		0.04	0.69			0.11	0.11		0.11	0.11
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	25	2259		74	2417			157	180		178	180
v/s Ratio Prot	0.01	c0.30		c0.03	0.13							
v/s Ratio Perm								c0.05	0.00		0.01	0.00
v/c Ratio	0.44	0.45		0.72	0.20			0.47	0.03		0.12	0.01
Uniform Delay, d1	31.4	5.4		30.4	3.7			26.6	25.3		25.6	25.3
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	11.9	0.1		27.9	0.0			2.2	0.1		0.3	0.0
Delay (s)	43.3	5.5		58.3	3.7			28.9	25.4		25.9	25.3
Level of Service	D	A		E	A			C	C		C	C
Approach Delay (s)		5.9			9.2			27.4			25.6	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	8.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	64.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
2: Wilbur Avenue & Viera Avenue

2030 PM no Ramps
11/6/2006

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↱		↰	↑	↰↱	
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	770	130	30	470	50	30
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	811	137	32	495	53	32
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			947		1437	879
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			947		1437	879
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		63	91
cM capacity (veh/h)			725		140	347

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	947	32	495	84
Volume Left	0	32	0	53
Volume Right	137	0	0	32
cSH	1700	725	1700	181
Volume to Capacity	0.56	0.04	0.29	0.47
Queue Length 95th (ft)	0	3	0	55
Control Delay (s)	0.0	10.2	0.0	41.2
Lane LOS		B		E
Approach Delay (s)	0.0	0.6		41.2
Approach LOS				E

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
3: Wilbur Avenue & SR 160 SB Off

2030 PM no Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↱		↰	↑↑					↰		↱
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	620	200	110	420	0	0	0	0	230	0	100
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	653	211	116	442	0	0	0	0	242	0	105
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	442			863			1211	1432	758	1432	1537	221
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	442			863			1211	1432	758	1432	1537	221
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			85			100	100	100	0	100	87
cM capacity (veh/h)	1114			775			106	113	350	84	98	783

Direction, Lane #	EB 1	WB 1	WB 2	WB 3	SB 1	SB 2
Volume Total	863	116	221	221	242	105
Volume Left	0	116	0	0	242	0
Volume Right	211	0	0	0	0	105
cSH	1700	775	1700	1700	84	783
Volume to Capacity	0.51	0.15	0.13	0.13	2.89	0.13
Queue Length 95th (ft)	0	13	0	0	590	12
Control Delay (s)	0.0	10.5	0.0	0.0	957.7	10.3
Lane LOS		B			F	B
Approach Delay (s)	0.0	2.2			670.6	
Approach LOS					F	

Intersection Summary			
Average Delay	132.4		
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
4: Wilbur Avenue & SR 160 NB On

2030 PM no Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑			↑↑↱		↰		↱			
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	350	500	0	0	480	160	50	0	80	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	368	526	0	0	505	168	53	0	84	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	674			526			1516	1937	263	1589	1853	337
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	674			526			1516	1937	263	1589	1853	337
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	60			100			6	100	89	100	100	100
cM capacity (veh/h)	913			1037			56	39	735	44	44	659

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2
Volume Total	368	263	263	337	337	53	84
Volume Left	368	0	0	0	0	53	0
Volume Right	0	0	0	0	168	0	84
cSH	913	1700	1700	1700	1700	56	735
Volume to Capacity	0.40	0.15	0.15	0.20	0.20	0.94	0.11
Queue Length 95th (ft)	49	0	0	0	0	106	10
Control Delay (s)	11.6	0.0	0.0	0.0	0.0	219.8	10.5
Lane LOS	B					F	B
Approach Delay (s)	4.8			0.0		91.0	
Approach LOS						F	

Intersection Summary			
Average Delay	9.8		
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
5: Wilbur Avenue & Bridgehead Road

2030 PM no Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	30	330	220	50	370	10	220	50	80	10	30	50
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	347	232	53	389	11	232	53	84	11	32	53

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1
Volume Total (vph)	32	579	453	368	95
Volume Left (vph)	32	0	53	232	11
Volume Right (vph)	0	232	11	84	53
Hadj (s)	0.53	-0.25	0.04	0.02	-0.28
Departure Headway (s)	8.0	7.2	7.1	7.4	8.4
Degree Utilization, x	0.07	1.15	0.90	0.76	0.22
Capacity (veh/h)	439	504	489	472	389
Control Delay (s)	10.4	114.1	45.2	29.8	13.8
Approach Delay (s)	108.7		45.2	29.8	13.8
Approach LOS	F		E	D	B

Intersection Summary			
Delay	65.0		
HCM Level of Service	F		
Intersection Capacity Utilization	90.0%	ICU Level of Service	E
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
6: E 18th Street & Hillcrest Avenue

2030 PM no Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↱		↰	↑	↱	↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3435		1770	3503		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3435		1770	3503		1770	1863	1583	1770	1863	1583
Volume (vph)	70	980	240	280	540	40	190	210	260	80	140	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	1032	253	295	568	42	200	221	274	84	147	63
RTOR Reduction (vph)	0	23	0	0	6	0	0	0	153	0	0	51
Lane Group Flow (vph)	74	1262	0	295	604	0	200	221	121	84	147	12
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases									8			4
Actuated Green, G (s)	6.2	31.5		14.0	39.3		9.0	17.2	17.2	6.2	14.4	14.4
Effective Green, g (s)	7.2	33.5		15.0	41.3		10.0	18.7	18.7	7.2	15.9	15.9
Actuated g/C Ratio	0.08	0.39		0.17	0.48		0.12	0.22	0.22	0.08	0.18	0.18
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	148	1332		307	1674		205	403	343	148	343	291
v/s Ratio Prot	0.04	c0.37		c0.17	0.17		c0.11	c0.12		0.05	0.08	
v/s Ratio Perm									0.08			0.01
v/c Ratio	0.50	0.95		0.96	0.36		0.98	0.55	0.35	0.57	0.43	0.04
Uniform Delay, d1	37.9	25.6		35.4	14.2		38.1	30.1	28.7	38.1	31.2	29.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.6	13.9		40.7	0.1		55.3	1.5	0.6	4.9	0.9	0.1
Delay (s)	40.5	39.5		76.1	14.4		93.4	31.6	29.3	43.0	32.1	29.0
Level of Service	D	D		E	B		F	C	C	D	C	C
Approach Delay (s)		39.6			34.5			48.5			34.6	
Approach LOS		D			C			D			C	

Intersection Summary			
HCM Average Control Delay	39.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	86.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	81.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
7: E 18th Street & Viera Avenue

2030 PM no Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑↱			↰↑	↱		✥	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	0.98			1.00	0.85		0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00		0.99	
Satd. Flow (prot)	1770	3539	1583	1770	3483			1788	1583		1717	
Flt Permitted	0.31	1.00	1.00	0.21	1.00			0.58	1.00		0.90	
Satd. Flow (perm)	583	3539	1583	399	3483			1079	1583		1564	
Volume (vph)	120	990	190	30	670	80	100	20	20	70	80	150
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	126	1042	200	32	705	84	105	21	21	74	84	158
RTOR Reduction (vph)	0	0	87	0	14	0	0	0	15	0	68	0
Lane Group Flow (vph)	126	1042	113	32	775	0	0	126	6	0	248	0
Turn Type	Perm		Perm	Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	23.5	23.5	23.5	23.5	23.5			11.7	11.7		11.7	
Effective Green, g (s)	25.5	25.5	25.5	25.5	25.5			13.7	13.7		13.7	
Actuated g/C Ratio	0.56	0.56	0.56	0.56	0.56			0.30	0.30		0.30	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	329	1997	893	225	1965			327	480		474	
v/s Ratio Prot		c0.29			0.22							
v/s Ratio Perm	0.22		0.07	0.08				0.12	0.00		c0.16	
v/c Ratio	0.38	0.52	0.13	0.14	0.39			0.39	0.01		0.52	
Uniform Delay, d1	5.5	6.1	4.6	4.7	5.5			12.4	11.0		13.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.7	0.2	0.1	0.3	0.1			0.8	0.0		1.0	
Delay (s)	6.2	6.3	4.7	5.0	5.7			13.2	11.0		14.1	
Level of Service	A	A	A	A	A			B	B		B	
Approach Delay (s)		6.1			5.6			12.9			14.1	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	7.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	45.2	Sum of lost time (s)	6.0
Intersection Capacity Utilization	64.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: E 18th Street & Phillips Lane

2030 PM no Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑	↱	↰	↑↱		↰↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.97	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.88		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3526		1770	3539	1583	1770	1631		3433	1592	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3526		1770	3539	1583	1770	1631		3433	1592	
Volume (vph)	280	790	20	20	470	230	20	10	50	250	10	310
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	295	832	21	21	495	242	21	11	53	263	11	326
RTOR Reduction (vph)	0	2	0	0	0	179	0	44	0	0	239	0
Lane Group Flow (vph)	295	851	0	21	495	63	21	20	0	263	98	0
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	5	2		1	6		4	7		8	3	
Permitted Phases						6						
Actuated Green, G (s)	14.1	30.9		0.6	17.4	17.4	1.3	11.2		7.9	17.8	
Effective Green, g (s)	14.1	30.9		0.6	17.4	17.4	1.3	11.2		7.9	17.8	
Actuated g/C Ratio	0.21	0.46		0.01	0.26	0.26	0.02	0.17		0.12	0.27	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	375	1636		16	925	414	35	274		407	425	
v/s Ratio Prot	c0.17	c0.24		0.01	0.14		0.01	0.01		c0.08	c0.06	
v/s Ratio Perm						0.04						
v/c Ratio	0.79	0.52		1.31	0.54	0.15	0.60	0.07		0.65	0.23	
Uniform Delay, d1	24.8	12.6		33.0	21.1	18.9	32.4	23.3		28.0	19.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.4	0.3		337.5	0.6	0.2	24.7	0.1		3.5	0.3	
Delay (s)	35.2	12.9		370.5	21.7	19.1	57.1	23.4		31.5	19.3	
Level of Service	D	B		F	C	B	E	C		C	B	
Approach Delay (s)		18.6			30.5			31.8			24.7	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM Average Control Delay	24.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	66.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

9: E 18th Street & SR 160 SB Off

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰↰	↑↑	↱		↰↑	↱	↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85		1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1719	3369		3335	3438	1538		1747	1538	1719	1702	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.75	1.00	0.68	1.00	
Satd. Flow (perm)	1719	3369		3335	3438	1538		1364	1538	1224	1702	
Volume (vph)	30	910	140	840	610	100	50	20	210	90	30	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	958	147	884	642	105	53	21	221	95	32	21
RTOR Reduction (vph)	0	8	0	0	0	25	0	0	0	0	19	0
Lane Group Flow (vph)	32	1097	0	884	642	80	0	74	221	95	34	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot		Perm	Perm		Free	Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases						6	8		Free	4		
Actuated Green, G (s)	3.6	57.8		36.3	90.5	90.5		12.9	120.0	12.9	12.9	
Effective Green, g (s)	3.6	58.8		36.3	91.5	91.5		12.9	120.0	12.9	12.9	
Actuated g/C Ratio	0.03	0.49		0.30	0.76	0.76		0.11	1.00	0.11	0.11	
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0		4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	4.0	4.0		2.0		2.0	2.0	
Lane Grp Cap (vph)	52	1651		1009	2621	1173		147	1538	132	183	
v/s Ratio Prot	0.02	c0.33		c0.27	0.19						0.02	
v/s Ratio Perm						0.05		0.05	0.14	c0.08		
v/c Ratio	0.62	0.66		0.88	0.24	0.07		0.50	0.14	0.72	0.19	
Uniform Delay, d1	57.5	23.1		39.7	4.2	3.6		50.5	0.0	51.8	48.8	
Progression Factor	1.00	1.00		0.91	0.87	0.67		1.00	1.00	1.00	1.00	
Incremental Delay, d2	19.7	2.1		8.1	0.2	0.1		1.0	0.2	14.5	0.2	
Delay (s)	77.2	25.3		44.4	3.8	2.5		51.5	0.2	66.3	49.0	
Level of Service	E	C		D	A	A		D	A	E	D	
Approach Delay (s)		26.7			25.7			13.1			60.1	
Approach LOS		C			C			B			E	

Intersection Summary			
HCM Average Control Delay	26.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

10: Main Street & SR 160 NB On

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↱		↰	↑↑↑	↰	↱↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		1.00	0.91	1.00	0.88
Frt	0.98		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	4842		1719	4940	1719	2707
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	4842		1719	4940	1719	2707
Volume (vph)	1050	160	250	1380	170	1410
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1105	168	263	1453	179	1484
RTOR Reduction (vph)	17	0	0	0	0	8
Lane Group Flow (vph)	1256	0	263	1453	179	1476
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Turn Type			Prot			pm+ov
Protected Phases	2		1	6	8	1
Permitted Phases						8
Actuated Green, G (s)	39.3		53.0	96.3	14.7	67.7
Effective Green, g (s)	40.3		53.0	97.3	14.7	67.7
Actuated g/C Ratio	0.34		0.44	0.81	0.12	0.56
Clearance Time (s)	5.0		4.0	5.0	4.0	4.0
Vehicle Extension (s)	4.0		3.0	4.0	2.0	3.0
Lane Grp Cap (vph)	1626		759	4006	211	1617
v/s Ratio Prot	c0.26		0.15	0.29	0.10	c0.40
v/s Ratio Perm						0.14
v/c Ratio	0.77		0.35	0.36	0.85	0.91
Uniform Delay, d1	35.7		22.1	3.0	51.6	23.5
Progression Factor	0.53		1.00	1.00	1.00	1.00
Incremental Delay, d2	3.1		0.3	0.3	24.9	8.3
Delay (s)	22.1		22.4	3.3	76.5	31.8
Level of Service	C		C	A	E	C
Approach Delay (s)	22.1			6.2	36.6	
Approach LOS	C			A	D	

Intersection Summary			
HCM Average Control Delay	21.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

11: Main Street & Bridgehead Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↑	↱	↰↰	↑↱		↰↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00	0.97	1.00		0.97	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	4807		1719	4940	1538	3335	1727		3335	1810	1538
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1719	4807		1719	4940	1538	3335	1727		3335	1810	1538
Volume (vph)	70	1960	430	120	1240	170	260	230	100	230	120	130
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	2063	453	126	1305	179	274	242	105	242	126	137
RTOR Reduction (vph)	0	27	0	0	0	87	0	12	0	0	0	124
Lane Group Flow (vph)	74	2489	0	126	1305	92	274	335	0	242	126	13
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot		Perm	Split			Split		Perm
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases						6						7
Actuated Green, G (s)	9.1	65.9		8.8	65.6	65.6	26.3	26.3		12.0	12.0	12.0
Effective Green, g (s)	9.1	66.9		8.8	66.6	66.6	26.3	26.3		12.0	12.0	12.0
Actuated g/C Ratio	0.07	0.51		0.07	0.51	0.51	0.20	0.20		0.09	0.09	0.09
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	120	2474		116	2531	788	675	349		308	167	142
v/s Ratio Prot	0.04	c0.52		c0.07	0.26		0.08	c0.19		c0.07	0.07	
v/s Ratio Perm						0.06						0.01
v/c Ratio	0.62	1.01		1.09	0.52	0.12	0.41	0.96		0.79	0.75	0.09
Uniform Delay, d1	58.8	31.5		60.6	21.0	16.4	45.1	51.3		57.7	57.6	54.0
Progression Factor	1.00	1.00		0.53	0.14	0.01	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	6.5	19.6		106.4	0.7	0.3	0.1	36.9		11.5	15.7	0.1
Delay (s)	65.2	51.1		138.7	3.6	0.4	45.2	88.2		69.2	73.2	54.1
Level of Service	E	D		F	A	A	D	F		E	E	D
Approach Delay (s)		51.5			13.8			69.3			66.1	
Approach LOS		D			B			E			E	

Intersection Summary			
HCM Average Control Delay	43.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	95.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

12: Main Street & Sandy Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↱		↰	↑↑↑		↰		↱			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0		4.0			
Lane Util. Factor		0.91		1.00	0.91		1.00		1.00			
Frt		0.99		1.00	1.00		1.00		0.85			
Flt Protected		1.00		0.95	1.00		0.95		1.00			
Satd. Flow (prot)		4872		1719	4940		1719		1538			
Flt Permitted		1.00		0.95	1.00		0.95		1.00			
Satd. Flow (perm)		4872		1719	4940		1719		1538			
Volume (vph)	0	2080	210	40	1420	0	110	0	160	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	2189	221	42	1495	0	116	0	168	0	0	0
RTOR Reduction (vph)	0	6	0	0	0	0	0	0	143	0	0	0
Lane Group Flow (vph)	0	2404	0	42	1495	0	116	0	25	0	0	0
Heavy Vehicles (%)	2%	5%	5%	5%	5%	2%	5%	2%	5%	2%	2%	2%
Turn Type				Prot			Prot		custom			
Protected Phases		2		1	6		3					
Permitted Phases									3			
Actuated Green, G (s)		95.8		7.5	106.8		13.7		13.7			
Effective Green, g (s)		96.3		7.5	107.8		14.2		14.2			
Actuated g/C Ratio		0.74		0.06	0.83		0.11		0.11			
Clearance Time (s)		4.5		4.0	5.0		4.5		4.5			
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0			
Lane Grp Cap (vph)		3609		99	4096		188		168			
v/s Ratio Prot		c0.49		0.02	c0.30		c0.07					
v/s Ratio Perm									0.02			
v/c Ratio		0.67		0.42	0.36		0.62		0.15			
Uniform Delay, d1		8.6		59.2	2.7		55.3		52.4			
Progression Factor		0.10		1.37	0.35		1.00		1.00			
Incremental Delay, d2		0.3		1.7	0.1		5.9		0.4			
Delay (s)		1.1		83.0	1.1		61.2		52.9			
Level of Service		A		F	A		E		D			
Approach Delay (s)		1.1			3.3			56.3			0.0	
Approach LOS		A			A			E			A	

Intersection Summary			
HCM Average Control Delay	5.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — 2030 PM no Ramps
13: Main Street & Live Oak Ave

11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑	↱	↰	↑↑↱		↰	↑↱		↰↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91		1.00	0.95		0.97	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.90		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	4940	1538	1719	4850		1719	3137		3433	3438	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	4940	1538	1719	4850		1719	3137		3433	3438	
Volume (vph)	150	1850	240	120	1200	210	190	110	200	260	300	70
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	158	1947	253	126	1263	221	200	116	211	274	316	74
RTOR Reduction (vph)	0	0	105	0	19	0	0	144	0	0	18	0
Lane Group Flow (vph)	158	1947	148	126	1465	0	200	183	0	274	372	0
Heavy Vehicles (%)	2%	5%	5%	5%	5%	2%	5%	2%	5%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2									
Actuated Green, G (s)	23.0	57.3	57.3	11.6	45.9		26.7	29.7		15.4	18.4	
Effective Green, g (s)	23.0	57.3	57.3	11.6	45.9		26.7	29.7		15.4	18.4	
Actuated g/C Ratio	0.18	0.44	0.44	0.09	0.35		0.21	0.23		0.12	0.14	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	313	2177	678	153	1712		353	717		407	487	
v/s Ratio Prot	0.09	c0.39		0.07	c0.30		c0.12	c0.06		0.08	c0.11	
v/s Ratio Perm			0.10									
v/c Ratio	0.50	0.89	0.22	0.82	0.86		0.57	0.26		0.67	0.76	
Uniform Delay, d1	48.4	33.6	22.5	58.2	39.0		46.4	41.1		54.9	53.7	
Progression Factor	0.57	0.38	0.29	0.91	0.39		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	4.8	0.6	25.2	4.9		2.1	0.2		4.4	7.0	
Delay (s)	28.3	17.7	7.2	78.0	20.0		48.5	41.3		59.2	60.7	
Level of Service	C	B	A	E	C		D	D		E	E	
Approach Delay (s)		17.3			24.6			44.0			60.1	
Approach LOS		B			C			D			E	

Intersection Summary			
HCM Average Control Delay	27.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — 2030 PM no Ramps
14: Main Street & Big Break Road

11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↱			↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.97	1.00
Satd. Flow (prot)	1770	3438	1583	1770	3438	1583	1770	1695			1800	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.51	1.00			0.49	1.00
Satd. Flow (perm)	1770	3438	1583	1770	3438	1583	959	1695			908	1583
Volume (vph)	270	1860	180	90	1180	80	120	60	90	90	40	230
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	284	1958	189	95	1242	84	126	63	95	95	42	242
RTOR Reduction (vph)	0	0	41	0	0	28	0	43	0	0	0	202
Lane Group Flow (vph)	284	1958	148	95	1242	56	126	115	0	0	137	40
Heavy Vehicles (%)	2%	5%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot		custom	Prot		custom	Perm			Perm		Perm
Protected Phases	5			1				3			7	
Permitted Phases		2	2		6	6	3			7		7
Actuated Green, G (s)	31.0	86.2	86.2	9.4	63.6	63.6	21.4	21.4			21.4	21.4
Effective Green, g (s)	32.0	87.2	87.2	9.4	64.6	64.6	21.4	21.4			21.4	21.4
Actuated g/C Ratio	0.25	0.67	0.67	0.07	0.50	0.50	0.16	0.16			0.16	0.16
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	436	2306	1062	128	1708	787	158	279			149	261
v/s Ratio Prot	0.16			0.05				0.07				
v/s Ratio Perm		c0.57	0.09		c0.36	0.04	0.13				c0.15	0.03
v/c Ratio	0.65	0.85	0.14	0.74	0.73	0.07	0.80	0.41			0.92	0.15
Uniform Delay, d1	44.0	16.4	7.8	59.1	25.8	17.1	52.2	48.6			53.5	46.5
Progression Factor	0.66	0.31	0.01	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	2.1	3.3	0.2	18.2	2.7	0.2	23.7	1.0			49.8	0.3
Delay (s)	31.0	8.3	0.3	77.3	28.5	17.2	75.9	49.6			103.2	46.8
Level of Service	C	A	A	E	C	B	E	D			F	D
Approach Delay (s)		10.3			31.1			61.3			67.2	
Approach LOS		B			C			E			E	

Intersection Summary			
HCM Average Control Delay	24.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis — 2030 PM no Ramps
15: Oakley Road & Neroly Road

11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	30	160	140	20	90	100	60	310	20	170	410	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	168	147	21	95	105	63	326	21	179	432	21

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	347	221	411	632
Volume Left (vph)	32	21	63	179
Volume Right (vph)	147	105	21	21
Hadj (s)	-0.20	-0.23	0.03	0.07
Departure Headway (s)	7.9	8.5	7.8	7.8
Degree Utilization, x	0.76	0.52	0.89	1.36
Capacity (veh/h)	439	388	449	471
Control Delay (s)	32.1	20.3	46.9	199.2
Approach Delay (s)	32.1	20.3	46.9	199.2
Approach LOS	D	C	E	F

Intersection Summary			
Delay	99.8		
HCM Level of Service	F		
Intersection Capacity Utilization	86.6%	ICU Level of Service	E
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis — 2030 PM no Ramps
16: Oakley Road & Live Oak Ave

11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	30	290	30	60	210	160	50	270	60	220	380	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	305	32	63	221	168	53	284	63	232	400	21

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	368	453	400	653
Volume Left (vph)	32	63	53	232
Volume Right (vph)	32	168	63	21
Hadj (s)	0.00	-0.16	-0.03	0.09
Departure Headway (s)	9.6	9.4	9.5	9.6
Degree Utilization, x	0.98	1.18	1.05	1.74
Capacity (veh/h)	368	389	385	379
Control Delay (s)	72.9	132.6	92.5	366.8
Approach Delay (s)	72.9	132.6	92.5	366.8
Approach LOS	F	F	F	F

Intersection Summary			
Delay	193.9		
HCM Level of Service	F		
Intersection Capacity Utilization	101.3%	ICU Level of Service	G
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
17: Oakley Road & Empire Avenue

2030 PM no Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↑	↱		↰↑	↱	↰	↑↱		↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95		1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1716	1583		1807	1583	1770	3515		1770	1863	1583
Flt Permitted	0.95	0.97	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1716	1583		1807	1583	1770	3515		1770	1863	1583
Volume (vph)	250	60	290	80	50	80	300	650	30	150	620	150
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	263	63	305	84	53	84	316	684	32	158	653	158
RTOR Reduction (vph)	0	0	266	0	0	71	0	3	0	0	0	100
Lane Group Flow (vph)	159	167	39	0	137	13	316	713	0	158	653	58
Turn Type	Split		Perm	Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8						6
Actuated Green, G (s)	10.5	10.5	10.5		11.4	11.4	12.0	29.5		11.6	29.1	29.1
Effective Green, g (s)	10.5	10.5	10.5		12.4	12.4	13.0	30.5		12.6	30.1	30.1
Actuated g/C Ratio	0.13	0.13	0.13		0.15	0.15	0.16	0.37		0.15	0.37	0.37
Clearance Time (s)	4.0	4.0	4.0		5.0	5.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	215	220	203		273	239	281	1307		272	684	581
v/s Ratio Prot	0.09	c0.10			c0.08		c0.18	0.20		0.09	c0.35	
v/s Ratio Perm			0.02			0.01						0.04
v/c Ratio	0.74	0.76	0.19		0.50	0.05	1.12	0.55		0.58	0.95	0.10
Uniform Delay, d1	34.4	34.5	32.0		32.0	29.8	34.5	20.3		32.2	25.3	17.0
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	12.5	13.9	0.5		1.5	0.1	91.5	0.5		3.1	23.6	0.1
Delay (s)	46.9	48.5	32.4		33.4	29.9	126.0	20.8		35.4	48.9	17.1
Level of Service	D	D	C		C	C	F	C		D	D	B
Approach Delay (s)		40.3			32.1			53.0			41.5	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM Average Control Delay	44.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	82.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	74.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: Main Street & Empire Avenue

2030 PM no Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↱		↰↰	↑	↱		↰↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.97	1.00
Satd. Flow (prot)	1719	3539	1538	1770	3527		3335	1810	1583		1787	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.97	1.00
Satd. Flow (perm)	1719	3539	1538	1770	3527		3335	1810	1583		1787	1538
Volume (vph)	40	1560	510	390	880	20	520	40	420	30	20	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	1642	537	411	926	21	547	42	442	32	21	32
RTOR Reduction (vph)	0	0	188	0	1	0	0	0	261	0	0	31
Lane Group Flow (vph)	42	1642	349	411	946	0	547	42	181	0	53	1
Heavy Vehicles (%)	5%	2%	5%	2%	2%	2%	5%	5%	2%	2%	5%	5%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	5.6	58.0	58.0	28.0	80.4		22.0	22.0	22.0		4.0	4.0
Effective Green, g (s)	6.6	59.0	59.0	29.0	81.4		23.0	23.0	23.0		4.0	4.0
Actuated g/C Ratio	0.05	0.45	0.45	0.22	0.62		0.18	0.18	0.18		0.03	0.03
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	87	1594	693	392	2192		586	318	278		55	47
v/s Ratio Prot	0.02	c0.46		c0.23	0.27		c0.16	0.02			c0.03	
v/s Ratio Perm			0.23						0.11			0.00
v/c Ratio	0.48	1.03	0.50	1.05	0.43		0.93	0.13	0.65		0.96	0.02
Uniform Delay, d1	60.5	36.0	25.6	51.0	12.8		53.2	45.6	50.3		63.4	61.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	4.2	30.6	0.6	58.7	0.1		22.0	0.2	5.2		107.4	0.2
Delay (s)	64.7	66.6	26.2	109.7	13.0		75.3	45.8	55.4		170.8	61.8
Level of Service	E	E	C	F	B		E	D	E		F	E
Approach Delay (s)		56.8			42.2			65.6			129.8	
Approach LOS		E			D			E			F	

Intersection Summary			
HCM Average Control Delay	55.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	131.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	96.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
19: Main Street & Vintage Parkway

2030 PM no Ramps
11/6/2006

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑	↑↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3503		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3539	3503		1770	1583
Volume (vph)	40	840	690	50	90	40
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	884	726	53	95	42
RTOR Reduction (vph)	0	0	4	0	0	36
Lane Group Flow (vph)	42	884	775	0	95	6
Turn Type	Prot					Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	3.9	44.3	36.4		9.0	9.0
Effective Green, g (s)	3.9	45.3	37.4		9.0	9.0
Actuated g/C Ratio	0.06	0.73	0.60		0.14	0.14
Clearance Time (s)	4.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	111	2573	2103		256	229
v/s Ratio Prot	0.02	c0.25	c0.22		c0.05	
v/s Ratio Perm						0.00
v/c Ratio	0.38	0.34	0.37		0.37	0.03
Uniform Delay, d1	28.0	3.1	6.4		24.1	22.9
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	2.2	0.1	0.1		0.9	0.0
Delay (s)	30.2	3.2	6.5		25.0	22.9
Level of Service	C	A	A		C	C
Approach Delay (s)		4.4	6.5		24.4	
Approach LOS		A	A		C	

Intersection Summary			
HCM Average Control Delay	6.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	62.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	39.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: Main Street & O'Hara Avenue

2030 PM no Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↱		↰	↱			↰↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.94			0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1770	1863	1583	1770	1854		1770	1751			1796	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.73	1.00			0.86	
Satd. Flow (perm)	1770	1863	1583	1770	1854		1361	1751			1580	
Volume (vph)	20	810	130	60	640	20	140	60	40	30	40	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	853	137	63	674	21	147	63	42	32	42	11
RTOR Reduction (vph)	0	0	49	0	1	0	0	29	0	0	7	0
Lane Group Flow (vph)	21	853	88	63	694	0	147	76	0	0	78	0
Turn Type	Prot		Perm	Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4				2			6		
Actuated Green, G (s)	1.4	48.5	48.5	3.4	50.5		11.5	11.5			12.5	
Effective Green, g (s)	1.4	49.5	49.5	3.4	51.5		12.5	12.5			12.5	
Actuated g/C Ratio	0.02	0.64	0.64	0.04	0.67		0.16	0.16			0.16	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	32	1191	1012	78	1234		220	283			255	
v/s Ratio Prot	0.01	c0.46		c0.04	0.37			0.04				
v/s Ratio Perm			0.06				c0.11				0.05	
v/c Ratio	0.66	0.72	0.09	0.81	0.56		0.67	0.27			0.31	
Uniform Delay, d1	37.8	9.3	5.3	36.7	6.9		30.5	28.5			28.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	39.4	2.1	0.0	43.8	0.6		7.5	0.5			0.7	
Delay (s)	77.1	11.4	5.4	80.4	7.5		38.0	29.0			29.3	
Level of Service	E	B	A	F	A		D	C			C	
Approach Delay (s)		11.9			13.6			34.2			29.3	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM Average Control Delay	15.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	77.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
21: Cypress Road & Empire Avenue

2030 PM no Ramps
11/6/2006

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↱		↰	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.97		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3423		1770	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	3423		1770	3539
Volume (vph)	150	260	790	220	260	780
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	158	274	832	232	274	821
RTOR Reduction (vph)	0	215	39	0	0	0
Lane Group Flow (vph)	158	59	1025	0	274	821
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	9.8	9.8	18.2		8.1	30.3
Effective Green, g (s)	10.8	10.8	19.2		8.1	31.3
Actuated g/C Ratio	0.22	0.22	0.38		0.16	0.62
Clearance Time (s)	5.0	5.0	5.0		4.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	382	341	1312		286	2211
v/s Ratio Prot	c0.09		c0.30		c0.15	0.23
v/s Ratio Perm		0.04				
v/c Ratio	0.41	0.17	0.78		0.96	0.37
Uniform Delay, d1	16.9	16.0	13.6		20.8	4.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.7	0.2	3.1		41.4	0.1
Delay (s)	17.7	16.3	16.7		62.2	4.7
Level of Service	B	B	B		E	A
Approach Delay (s)	16.8		16.7			19.1
Approach LOS	B		B			B

Intersection Summary			
HCM Average Control Delay	17.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	50.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
22: Cypress Road & Main Street

2030 PM no Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↱	↱	↰	↑↑	↱	↰↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	0.95	1.00	0.95	1.00	0.97	0.95	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3456		1770	1770	1504	1770	3539	1583	3433	3527	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3456		1770	1770	1504	1770	3539	1583	3433	3527	
Volume (vph)	100	380	70	280	380	770	130	400	410	1020	880	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	400	74	295	400	811	137	421	432	1074	926	21
RTOR Reduction (vph)	0	15	0	0	0	45	0	0	8	0	2	0
Lane Group Flow (vph)	105	459	0	295	400	766	137	421	424	1074	945	0
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		
Protected Phases	7	4		3	8	1	5	2	3	1	6	
Permitted Phases						8			2			
Actuated Green, G (s)	6.0	14.0		17.0	25.0	55.0	12.4	23.0	40.0	30.0	40.6	
Effective Green, g (s)	6.0	14.0		17.0	25.0	55.0	12.4	23.0	40.0	30.0	40.6	
Actuated g/C Ratio	0.06	0.14		0.17	0.25	0.55	0.12	0.23	0.40	0.30	0.41	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	106	484		301	443	887	219	814	697	1030	1432	
v/s Ratio Prot	0.06	0.13		c0.17	0.23	c0.26	0.08	0.12	0.10	c0.31	c0.27	
v/s Ratio Perm						0.25			0.16			
v/c Ratio	0.99	0.95		0.98	0.90	0.86	0.63	0.52	0.61	1.04	0.66	
Uniform Delay, d1	47.0	42.6		41.3	36.3	19.3	41.6	33.6	23.8	35.0	24.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	84.2	27.8		46.2	21.3	8.8	5.5	2.3	1.5	39.8	2.4	
Delay (s)	131.2	70.5		87.6	57.7	28.1	47.1	36.0	25.3	74.8	26.5	
Level of Service	F	E		F	E	C	D	D	C	E	C	
Approach Delay (s)		81.5			47.6			32.9			52.2	
Approach LOS		F			D			C			D	

Intersection Summary			
HCM Average Control Delay	50.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	94.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
23: Neroly Road & Live Oak Ave

2030 PM no Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↱			↰↱			↰↑↱			↰↑↱	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	20	360	240	150	360	200	100	220	60	160	220	30
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	379	253	158	379	211	105	232	63	168	232	32

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	211	442	347	400	400	432
Volume Left (vph)	21	0	158	0	105	168
Volume Right (vph)	0	253	0	211	63	32
Hadj (s)	0.08	-0.37	0.26	-0.33	-0.01	0.07
Departure Headway (s)	9.7	9.3	9.9	9.3	9.4	9.5
Degree Utilization, x	0.57	1.14	0.95	1.03	1.05	1.14
Capacity (veh/h)	361	392	360	400	386	381
Control Delay (s)	23.5	117.6	67.3	84.7	91.5	121.3
Approach Delay (s)	87.3		76.6		91.5	121.3
Approach LOS	F		F		F	F

Intersection Summary			
Delay	91.0		
HCM Level of Service	F		
Intersection Capacity Utilization	84.0%	ICU Level of Service	E
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
24: Laurel Road & Live Oak Avenue

2030 PM no Ramps
11/6/2006

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰↰	↑↑↑	↑↑↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	0.91	0.91		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3433	5085	5009		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	3433	5085	5009		1770	1583
Volume (vph)	550	1950	1430	160	360	190
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	579	2053	1505	168	379	200
RTOR Reduction (vph)	0	0	19	0	0	148
Lane Group Flow (vph)	579	2053	1654	0	379	52
Turn Type	Prot					Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	13.0	41.9	24.9		17.7	17.7
Effective Green, g (s)	13.0	41.9	24.9		17.7	17.7
Actuated g/C Ratio	0.19	0.62	0.37		0.26	0.26
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	660	3152	1845		463	414
v/s Ratio Prot	c0.17	0.40	c0.33		c0.21	
v/s Ratio Perm						0.03
v/c Ratio	0.88	0.65	0.90		0.82	0.13
Uniform Delay, d1	26.5	8.2	20.1		23.4	19.0
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	12.6	0.5	6.2		10.8	0.1
Delay (s)	39.1	8.7	26.3		34.2	19.2
Level of Service	D	A	C		C	B
Approach Delay (s)		15.4	26.3		29.0	
Approach LOS		B	C		C	

Intersection Summary			
HCM Average Control Delay	20.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	67.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

25: Laurel Road & Empire Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.98		1.00	0.97		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3447		1770	3484		1770	3428		1770	3271	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3447		1770	3484		1770	3428		1770	3271	
Volume (vph)	550	1480	310	110	1030	120	160	450	120	180	390	400
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	579	1558	326	116	1084	126	168	474	126	189	411	421
RTOR Reduction (vph)	0	13	0	0	7	0	0	19	0	0	142	0
Lane Group Flow (vph)	579	1871	0	116	1203	0	168	581	0	189	690	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	37.0	68.0		9.0	40.0		11.0	24.0		13.0	26.0	
Effective Green, g (s)	37.0	68.0		9.0	40.0		11.0	24.0		13.0	26.0	
Actuated g/C Ratio	0.28	0.52		0.07	0.31		0.08	0.18		0.10	0.20	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	504	1803		123	1072		150	633		177	654	
v/s Ratio Prot	c0.33	0.54		0.07	c0.35		0.09	0.17		c0.11	c0.21	
v/s Ratio Perm												
v/c Ratio	1.15	1.04		0.94	1.12		1.12	0.92		1.07	1.05	
Uniform Delay, d1	46.5	31.0		60.2	45.0		59.5	52.0		58.5	52.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	88.0	31.6		63.2	67.6		109.3	18.3		86.8	50.4	
Delay (s)	134.5	62.6		123.5	112.6		168.8	70.3		145.3	102.4	
Level of Service	F	E		F	F		F	E		F	F	
Approach Delay (s)		79.5			113.5			91.9			110.3	
Approach LOS		E			F			F			F	

Intersection Summary			
HCM Average Control Delay	94.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	108.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION     9 SR 160 SB Ramp/Main Street        Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            20   30   90
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    30 ---  1.0   1.1  1.1  1.0   1.0 ---  100  RIGHT
                                                          STREET NAME:
THRU   910 ---> 2.1  (NO. OF LANES)   2.0<---  610  THRU  Main Street

RIGHT  140 ---  1.1   1.1  1.1  1.9   2.0 ---  840  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  50   20  210                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 SB Ramp
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     210        210       1650     0.1273
    THRU (T)       20         20       1650     0.0121
    LEFT (L)       50         50       1650     0.0303
    T + L                     70       1650     0.0424     0.0424
------------------------------------------------------------------------
SB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)       30         30       1650     0.0182
    LEFT (L)       90         90       1650     0.0545     0.0545
    T + R                     50       1650     0.0303
------------------------------------------------------------------------
EB  RIGHT (R)     140        140       1650     0.0848
    THRU (T)      910        910       3300     0.2758
    LEFT (L)       30         30       1650     0.0182
    T + R                   1050       3300     0.3182     0.3182
------------------------------------------------------------------------
WB  RIGHT (R)     100         10 *     1650     0.0061
    THRU (T)      610        610       3300     0.1848
    LEFT (L)      840        840       3000     0.2800     0.2800
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.70
     INTERSECTION LEVEL OF SERVICE:                             B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION    10 SR 160 NB Ramp/Main Street        Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0    0    0
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  RIGHT
                                                          STREET NAME:
THRU  1050 ---> 3.1  (NO. OF LANES)   3.0<--- 1380  THRU  Main Street

RIGHT  160 ---  1.1   1.0  0.0  2.5   1.0 ---  250  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 170    0 1410                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 NB Ramp
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)    1410        955 *     3127     0.3054     0.3054
    LEFT (L)      170        170       1720     0.0988
------------------------------------------------------------------------
EB  RIGHT (R)     160        160       1720     0.0930
    THRU (T)     1050       1050       5160     0.2035
    T + R                   1210       5160     0.2345     0.2345
------------------------------------------------------------------------
WB  THRU (T)     1380       1380       5160     0.2674
    LEFT (L)      250        250       1720     0.1453     0.1453
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.69
     INTERSECTION LEVEL OF SERVICE:                             B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION    11 Neroly/Main Street                Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------           130  120  230
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    70 ---  1.0   1.0  1.0  2.0   1.0 ---  170  RIGHT
                                                          STREET NAME:
THRU  1960 ---> 3.1  (NO. OF LANES)   3.0<--- 1240  THRU  Main Street

RIGHT  430 ---  1.1   2.0  1.1  1.1   1.0 ---  120  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 260  230  100                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Neroly
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     100        100       1650     0.0606
    THRU (T)      230        230       1650     0.1394
    LEFT (L)      260        260       3000     0.0867
    T + R                    330       1650     0.2000     0.2000
------------------------------------------------------------------------
SB  RIGHT (R)     130         60 *     1650     0.0364
    THRU (T)      120        120       1650     0.0727
    LEFT (L)      230        230       3000     0.0767     0.0767
------------------------------------------------------------------------
EB  RIGHT (R)     430        430       1650     0.2606
    THRU (T)     1960       1960       4950     0.3960
    LEFT (L)       70         70       1650     0.0424
    T + R                   2390       4950     0.4828     0.4828
------------------------------------------------------------------------
WB  RIGHT (R)     170         44 *     1650     0.0267
    THRU (T)     1240       1240       4950     0.2505
    LEFT (L)      120        120       1650     0.0727     0.0727
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.83
     INTERSECTION LEVEL OF SERVICE:                             D
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION    12 Sandy/Main Street                 Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0    0    0
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  RIGHT
                                                          STREET NAME:
THRU  2080 ---> 3.1  (NO. OF LANES)   3.0<--- 1420  THRU  Main Street

RIGHT  210 ---  1.1   1.0  0.0  1.0   1.0 ---   40  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 110    0  160                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Sandy
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     160        120 *     1720     0.0698     0.0698
    LEFT (L)      110        110       1720     0.0640
------------------------------------------------------------------------
EB  RIGHT (R)     210        210       1720     0.1221
    THRU (T)     2080       2080       5160     0.4031
    T + R                   2290       5160     0.4438     0.4438
------------------------------------------------------------------------
WB  THRU (T)     1420       1420       5160     0.2752
    LEFT (L)       40         40       1720     0.0233     0.0233
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.54
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION    13 Live Oak/Main Street              Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            70  300  260
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   150 ---  1.0   1.1  2.1  2.0   1.1 ---  210  RIGHT
                                                          STREET NAME:
THRU  1850 ---> 3.0  (NO. OF LANES)   3.1<--- 1200  THRU  Main Street

RIGHT  240 ---  1.0   1.0  2.1  1.1   1.0 ---  120  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 190  110  200                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     200        200       1650     0.1212
    THRU (T)      110        110       3300     0.0333
    LEFT (L)      190        190       1650     0.1152     0.1152
    T + R                    310       3300     0.0939
------------------------------------------------------------------------
SB  RIGHT (R)      70         70       1650     0.0424
    THRU (T)      300        300       3300     0.0909
    LEFT (L)      260        260       3000     0.0867
    T + R                    370       3300     0.1121     0.1121
------------------------------------------------------------------------
EB  RIGHT (R)     240         50 *     1650     0.0303
    THRU (T)     1850       1850       4950     0.3737     0.3737
    LEFT (L)      150        150       1650     0.0909
------------------------------------------------------------------------
WB  RIGHT (R)     210        210       1650     0.1273
    THRU (T)     1200       1200       4950     0.2424
    LEFT (L)      120        120       1650     0.0727     0.0727
    T + R                   1410       4950     0.2848
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.67
     INTERSECTION LEVEL OF SERVICE:                             B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION    14 Big Break/Main Street             Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------           230   40   90
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   270 ---  1.0   1.0  1.1  1.1   1.0 ---   80  RIGHT
                                                          STREET NAME:
THRU  1860 ---> 2.0  (NO. OF LANES)   2.0<--- 1180  THRU  Main Street

RIGHT  180 ---  1.0   1.0  1.1  1.1   1.0 ---   90  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 120   60   90                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Big Break
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      90         90       1650     0.0545
    THRU (T)       60         60       1650     0.0364
    LEFT (L)      120        120       1650     0.0727     0.0727
    T + R                    150       1650     0.0909
------------------------------------------------------------------------
SB  RIGHT (R)     230          0 *     1650     0.0000
    THRU (T)       40         40       1650     0.0242
    LEFT (L)       90         90       1650     0.0545
    T + L                    130       1650     0.0788     0.0788
------------------------------------------------------------------------
EB  RIGHT (R)     180         60 *     1650     0.0364
    THRU (T)     1860       1860       3300     0.5636     0.5636
    LEFT (L)      270        270       1650     0.1636
------------------------------------------------------------------------
WB  RIGHT (R)      80          0 *     1650     0.0000
    THRU (T)     1180       1180       3300     0.3576
    LEFT (L)       90         90       1650     0.0545     0.0545
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.77
     INTERSECTION LEVEL OF SERVICE:                             C
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION    17 Empire Ave/Oakley Road            Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------           150  620  150
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? Y
LEFT   250 ---  2.1   1.0  1.0  1.0   1.0 ---   80  RIGHT
                                                          STREET NAME:
THRU    60 ---> 1.1  (NO. OF LANES)   1.1<---   50  THRU  Oakley Road

RIGHT  290 ---  1.0   1.0  2.1  1.1   1.1 ---   80  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 300  650   30                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire Ave
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      30         30       1650     0.0182
    THRU (T)      650        650       3300     0.1970
    LEFT (L)      300        300       1650     0.1818     0.1818
    T + R                    680       3300     0.2061
------------------------------------------------------------------------
SB  RIGHT (R)     150         13 *     1650     0.0079
    THRU (T)      620        620       1650     0.3758     0.3758
    LEFT (L)      150        150       1650     0.0909
------------------------------------------------------------------------
EB  RIGHT (R)     290          0 *     1650     0.0000
    THRU (T)       60         60       1650     0.0364
    LEFT (L)      250        250       3000     0.0833
    T + L                    310       3000     0.1033     0.1033
------------------------------------------------------------------------
WB  RIGHT (R)      80          0 *     1650     0.0000
    THRU (T)       50         50       1650     0.0303
    LEFT (L)       80         80       1650     0.0485
    T + L                    130       1650     0.0788     0.0788
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.74
     INTERSECTION LEVEL OF SERVICE:                             C
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION    18 Empire Avenue/Main Street         Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------            30   20   30
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    40 ---  1.0   1.0  1.1  1.1   1.1 ---   20  RIGHT
                                                          STREET NAME:
THRU  1560 ---> 2.0  (NO. OF LANES)   2.1<---  880  THRU  Main Street

RIGHT  510 ---  1.0   2.0  1.0  1.0   1.0 ---  390  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 520   40  420                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Empire Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     420         30 *     1650     0.0182
    THRU (T)       40         40       1650     0.0242
    LEFT (L)      520        520       3000     0.1733     0.1733
------------------------------------------------------------------------
SB  RIGHT (R)      30          0 *     1650     0.0000
    THRU (T)       20         20       1650     0.0121
    LEFT (L)       30         30       1650     0.0182
    T + L                     50       1650     0.0303     0.0303
------------------------------------------------------------------------
EB  RIGHT (R)     510        224 *     1650     0.1358
    THRU (T)     1560       1560       3300     0.4727     0.4727
    LEFT (L)       40         40       1650     0.0242
------------------------------------------------------------------------
WB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)      880        880       3300     0.2667
    LEFT (L)      390        390       1650     0.2364     0.2364
    T + R                    900       3300     0.2727
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.91
     INTERSECTION LEVEL OF SERVICE:                             E
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION    19 Vintage/Main Street               Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------            40    0   90
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    40 ---  1.0   1.0  0.0  1.0   1.1 ---   50  RIGHT
                                                          STREET NAME:
THRU   840 ---> 2.0  (NO. OF LANES)   2.1<---  690  THRU  Main Street

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=N, Rur=Y
  S                    LEFT THRU RIGHT Split? N

               STREET NAME: Vintage
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)      40          0 *     1720     0.0000
    LEFT (L)       90         90       1720     0.0523    0.0523
------------------------------------------------------------------------
EB  THRU (T)      840        840       3440     0.2442    0.2442
    LEFT (L)       40         40       1720     0.0233
------------------------------------------------------------------------
WB  RIGHT (R)      50         50       1720     0.0291
    THRU (T)      690        690       3440     0.2006
    T + R                    740       3440     0.2151
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                          0.30
     INTERSECTION LEVEL OF SERVICE:                              A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION    20 O'Hara Avenue/Main Street         Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            10   40   30
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    20 ---  1.0   1.1  1.1  1.1   1.1 ---   20  RIGHT
                                                          STREET NAME:
THRU   810 ---> 1.0  (NO. OF LANES)   1.1<---  640  THRU  Main Street

RIGHT  130 ---  1.0   1.0  1.1  1.1   1.0 ---   60  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 140   60   40                         Urb=Y, Rur=Y
  S                    LEFT THRU RIGHT Split? N

               STREET NAME: O'Hara Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      40         40       1650     0.0242
    THRU (T)       60         60       1650     0.0364
    LEFT (L)      140        140       1650     0.0848    0.0848
    T + R                    100       1650     0.0606
------------------------------------------------------------------------
SB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)       40         40       1650     0.0242
    LEFT (L)       30         30       1650     0.0182
    T + R                     50       1650     0.0303
    T + L                     70       1650     0.0424
    T + R + L                 80       1650     0.0485    0.0485
------------------------------------------------------------------------
EB  RIGHT (R)     130          0 *     1650     0.0000
    THRU (T)      810        810       1650     0.4909    0.4909
    LEFT (L)       20         20       1650     0.0121
------------------------------------------------------------------------
WB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)      640        640       1650     0.3879
    LEFT (L)       60         60       1650     0.0364    0.0364
    T + R                    660       1650     0.4000
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                          0.66
     INTERSECTION LEVEL OF SERVICE:                              B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION    21 Empire Avenue/Cypress Road        Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0  780  260
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  2.0  1.0   1.0 ---  260  RIGHT
                                                          STREET NAME:
THRU     0 ---> 0.0  (NO. OF LANES)   0.0<---    0  THRU  Cypress Road

RIGHT    0 ---  0.0   0.0  2.1  1.1   1.0 ---  150  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0  790  220                         Urb=Y, Rur=Y
  S                    LEFT THRU RIGHT Split? N

               STREET NAME: Empire Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     220        220       1720     0.1279
    THRU (T)      790        790       3440     0.2297
    T + R                   1010       3440     0.2936    0.2936
------------------------------------------------------------------------
SB  THRU (T)      780        780       3440     0.2267
    LEFT (L)      260        260       1720     0.1512    0.1512
------------------------------------------------------------------------
WB  RIGHT (R)     260          0 *     1720     0.0000
    LEFT (L)      150        150       1720     0.0872    0.0872
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                          0.53
     INTERSECTION LEVEL OF SERVICE:                              A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION    22 Main Street/Cypress               Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            20  880 1020
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   100 ---  1.0   1.1  2.1  2.0   2.6 ---  770  RIGHT
                                                          STREET NAME:
THRU   380 ---> 2.1  (NO. OF LANES)   1.1<---  380  THRU  Cypress

RIGHT   70 ---  1.1   1.0  2.0  1.5   1.0 ---  280  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 130  400  410                         Urb=Y, Rur=Y
  S                    LEFT THRU RIGHT Split? N

               STREET NAME: Main Street
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     410        130 *     1650     0.0788
    THRU (T)      400        400       3300     0.1212    0.1212
    LEFT (L)      130        130       1650     0.0788
------------------------------------------------------------------------
SB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)      880        880       3300     0.2667
    LEFT (L)     1020       1020       3000     0.3400    0.3400
    T + R                    900       3300     0.2727
------------------------------------------------------------------------
EB  RIGHT (R)      70         70       1650     0.0424
    THRU (T)      380        380       3300     0.1152
    LEFT (L)      100        100       1650     0.0606
    T + R                    450       3300     0.1364    0.1364
------------------------------------------------------------------------
WB  RIGHT (R)     770        209 *     3000     0.0697
    THRU (T)      380        380       1650     0.2303
    LEFT (L)      280        280       1650     0.1697    0.1697
    T + R                    589       3000     0.1963
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                          0.77
     INTERSECTION LEVEL OF SERVICE:                              C
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION    24 Live Oak/Laurel                   Oakley
Count Date                   Time               Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------           190    0  360
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   550 ---  2.0   1.0  0.0  1.0   1.1 ---  160  RIGHT
                                                          STREET NAME:
THRU  1950 ---> 3.0  (NO. OF LANES)   3.1<--- 1430  THRU  Laurel

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)     190          0 *     1720     0.0000
    LEFT (L)      360        360       1720     0.2093     0.2093
------------------------------------------------------------------------
EB  THRU (T)     1950       1950       5160     0.3779
    LEFT (L)      550        550       3127     0.1759     0.1759
------------------------------------------------------------------------
WB  RIGHT (R)     160        160       1720     0.0930
    THRU (T)     1430       1430       5160     0.2771
    T + R                   1590       5160     0.3081     0.3081
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.69
     INTERSECTION LEVEL OF SERVICE:                             B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION    25 Empire/Laurel                     Oakley
Count Date                   Time               Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------           400  390  180
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   550 ---  1.0   1.1  2.1  1.0   1.1 ---  120  RIGHT
                                                          STREET NAME:
THRU  1480 ---> 2.1  (NO. OF LANES)   2.1<--- 1030  THRU  Laurel

RIGHT  310 ---  1.1   1.0  2.1  1.1   1.0 ---  110  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 160  450  120                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     120        120       1650     0.0727
    THRU (T)      450        450       3300     0.1364
    LEFT (L)      160        160       1650     0.0970     0.0970
    T + R                    570       3300     0.1727
------------------------------------------------------------------------
SB  RIGHT (R)     400        400       1650     0.2424     0.2424
    THRU (T)      390        390       3300     0.1182
    LEFT (L)      180        180       1650     0.1091
    T + R                    790       3300     0.2394
------------------------------------------------------------------------
EB  RIGHT (R)     310        310       1650     0.1879
    THRU (T)     1480       1480       3300     0.4485
    LEFT (L)      550        550       1650     0.3333     0.3333
    T + R                   1790       3300     0.5424
------------------------------------------------------------------------
WB  RIGHT (R)     120        120       1650     0.0727
    THRU (T)     1030       1030       3300     0.3121
    LEFT (L)      110        110       1650     0.0667
    T + R                   1150       3300     0.3485     0.3485
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         1.02
     INTERSECTION LEVEL OF SERVICE:                             F
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION     1 Minaker/Wilbur                    Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            20   10   10
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    10 ---  1.0   1.0  1.1  1.1   1.1 ---   10  RIGHT
                                                          STREET NAME:
THRU   800 ---> 2.1  (NO. OF LANES)   2.1<---  440  THRU  Wilbur

RIGHT  190 ---  1.1   1.1  1.1  1.0   1.0 ---   50  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  70    0   50                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Minaker
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      50          0 *     1650     0.0000
    THRU (T)        0          0       1650     0.0000
    LEFT (L)       70         70       1650     0.0424     0.0424
    T + L                     70       1650     0.0424
------------------------------------------------------------------------
SB  RIGHT (R)      20         10 *     1650     0.0061
    THRU (T)       10         10       1650     0.0061
    LEFT (L)       10         10       1650     0.0061
    T + L                     20       1650     0.0121     0.0121
------------------------------------------------------------------------
EB  RIGHT (R)     190        190       1650     0.1152
    THRU (T)      800        800       3300     0.2424
    LEFT (L)       10         10       1650     0.0061
    T + R                    990       3300     0.3000     0.3000
------------------------------------------------------------------------
WB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      440        440       3300     0.1333
    LEFT (L)       50         50       1650     0.0303     0.0303
    T + R                    450       3300     0.1364
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.38
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION     6 Hillcrest/18th St                 Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            60  140   80
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    70 ---  1.0   1.0  1.0  1.0   1.1 ---   40  RIGHT
                                                          STREET NAME:
THRU   980 ---> 2.1  (NO. OF LANES)   2.1<---  540  THRU  18th St

RIGHT  240 ---  1.1   1.0  1.0  1.0   1.0 ---  280  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 190  210  260                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Hillcrest
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     260          0 *     1650     0.0000
    THRU (T)      210        210       1650     0.1273
    LEFT (L)      190        190       1650     0.1152     0.1152
------------------------------------------------------------------------
SB  RIGHT (R)      60          0 *     1650     0.0000
    THRU (T)      140        140       1650     0.0848     0.0848
    LEFT (L)       80         80       1650     0.0485
------------------------------------------------------------------------
EB  RIGHT (R)     240        240       1650     0.1455
    THRU (T)      980        980       3300     0.2970
    LEFT (L)       70         70       1650     0.0424
    T + R                   1220       3300     0.3697     0.3697
------------------------------------------------------------------------
WB  RIGHT (R)      40         40       1650     0.0242
    THRU (T)      540        540       3300     0.1636
    LEFT (L)      280        280       1650     0.1697     0.1697
    T + R                    580       3300     0.1758
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.74
     INTERSECTION LEVEL OF SERVICE:                             C
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION     7 Viera/18th St                     Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       2-PHASE SIGNAL
-----------           150   80   70
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   120 ---  1.0   1.1  1.1  1.1   1.1 ---   80  RIGHT
                                                          STREET NAME:
THRU   990 ---> 2.0  (NO. OF LANES)   2.1<---  670  THRU  18th St

RIGHT  190 ---  1.0   1.1  1.1  1.0   1.0 ---   30  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 100   20   20                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Viera
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      20          0 *     1800     0.0000
    THRU (T)       20         20       1800     0.0111
    LEFT (L)      100        100       1800     0.0556     0.0556
    T + L                    120       1800     0.0667
------------------------------------------------------------------------
SB  RIGHT (R)     150        150       1800     0.0833
    THRU (T)       80         80       1800     0.0444
    LEFT (L)       70         70       1800     0.0389
    T + R                    230       1800     0.1278
    T + L                    150       1800     0.0833
    T + R + L                300       1800     0.1667     0.1667
------------------------------------------------------------------------
EB  RIGHT (R)     190         90 *     1800     0.0500
    THRU (T)      990        990       3600     0.2750     0.2750
    LEFT (L)      120        120       1800     0.0667
------------------------------------------------------------------------
WB  RIGHT (R)      80         80       1800     0.0444
    THRU (T)      670        670       3600     0.1861
    LEFT (L)       30         30       1800     0.0167     0.0167
    T + R                    750       3600     0.2083
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.51
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 No Project NO RAMPS                             11/02/06
========================================================================
INTERSECTION     8 Phillips Lane/18th Street         Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------           310   10  250
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   280 ---  1.0   1.1  1.1  2.0   1.0 ---  230  RIGHT
                                                          STREET NAME:
THRU   790 ---> 2.1  (NO. OF LANES)   2.0<---  470  THRU  18th Street

RIGHT   20 ---  1.1   1.0  1.1  1.1   1.0 ---   20  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  20   10   50                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Phillips Lane
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)       10         10       1650     0.0061
    LEFT (L)       20         20       1650     0.0121     0.0121
    T + R                     60       1650     0.0364
------------------------------------------------------------------------
SB  RIGHT (R)     310        310       1650     0.1879
    THRU (T)       10         10       1650     0.0061
    LEFT (L)      250        250       3000     0.0833
    T + R                    320       1650     0.1939     0.1939
------------------------------------------------------------------------
EB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)      790        790       3300     0.2394
    LEFT (L)      280        280       1650     0.1697     0.1697
    T + R                    810       3300     0.2455
------------------------------------------------------------------------
WB  RIGHT (R)     230         93 *     1650     0.0564
    THRU (T)      470        470       3300     0.1424     0.1424
    LEFT (L)       20         20       1650     0.0121
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.52
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_NP.INT,VOL=2030_NP.PM,CAP=
```

HCM Signalized Intersection Capacity Analysis
1: Wilbur Avenue & Minaker Drive

2030 PM & Proj no Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱			↰	↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	0.98		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.97	1.00
Satd. Flow (prot)	1770	3477		1770	3533			1777	1583		1801	1583
Flt Permitted	0.95	1.00		0.95	1.00			0.72	1.00		0.82	1.00
Satd. Flow (perm)	1770	3477		1770	3533			1344	1583		1527	1583
Volume (vph)	20	380	50	30	826	10	140	5	20	10	5	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	400	53	32	869	11	147	5	21	11	5	21
RTOR Reduction (vph)	0	12	0	0	1	0	0	0	17	0	0	17
Lane Group Flow (vph)	21	441	0	32	879	0	0	152	4	0	16	4
Turn Type	Prot			Prot			Perm		Perm	Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		4
Actuated Green, G (s)	1.3	31.1		1.4	31.2			11.1	11.1		11.1	11.1
Effective Green, g (s)	1.3	31.1		1.4	31.2			11.1	11.1		11.1	11.1
Actuated g/C Ratio	0.02	0.56		0.03	0.56			0.20	0.20		0.20	0.20
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	41	1945		45	1983			268	316		305	316
v/s Ratio Prot	0.01	0.13		c0.02	c0.25							
v/s Ratio Perm								c0.11	0.00		0.01	0.00
v/c Ratio	0.51	0.23		0.71	0.44			0.57	0.01		0.05	0.01
Uniform Delay, d1	26.8	6.2		26.9	7.1			20.1	17.9		18.0	17.9
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	10.4	0.1		41.4	0.2			2.7	0.0		0.1	0.0
Delay (s)	37.2	6.2		68.3	7.3			22.8	17.9		18.1	17.9
Level of Service	D	A		E	A			C	B		B	B
Approach Delay (s)		7.6			9.4			22.2			18.0	
Approach LOS		A			A			C			B	

Intersection Summary			
HCM Average Control Delay	10.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	55.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
2: Wilbur Avenue & Viera Avenue

2030 PM & Proj no Ramps
11/6/2006

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱		↰	↑	↰↱	
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	420	30	25	844	70	66
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	442	32	26	888	74	69
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			474		1399	458
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			474		1399	458
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		51	88
cM capacity (veh/h)			1088		151	603

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	474	26	888	143
Volume Left	0	26	0	74
Volume Right	32	0	0	69
cSH	1700	1088	1700	238
Volume to Capacity	0.28	0.02	0.52	0.60
Queue Length 95th (ft)	0	2	0	88
Control Delay (s)	0.0	8.4	0.0	40.8
Lane LOS		A		E
Approach Delay (s)	0.0	0.2		40.8
Approach LOS				E

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
3: Wilbur Avenue & SR 160 SB Off

2030 PM & Proj no Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱		↰	↑↑					↰		↱
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	376	90	240	669	0	0	0	0	251	0	140
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	396	95	253	704	0	0	0	0	264	0	147
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	704			491			1301	1653	443	1653	1700	352
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	704			491			1301	1653	443	1653	1700	352
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			76			100	100	100	0	100	77
cM capacity (veh/h)	889			1069			75	74	562	53	70	644

Direction, Lane #	EB 1	WB 1	WB 2	WB 3	SB 1	SB 2
Volume Total	491	253	352	352	264	147
Volume Left	0	253	0	0	264	0
Volume Right	95	0	0	0	0	147
cSH	1700	1069	1700	1700	53	644
Volume to Capacity	0.29	0.24	0.21	0.21	4.99	0.23
Queue Length 95th (ft)	0	23	0	0	Err	22
Control Delay (s)	0.0	9.4	0.0	0.0	Err	12.2
Lane LOS		A			F	B
Approach Delay (s)	0.0	2.5			6423.2	
Approach LOS					F	

Intersection Summary			
Average Delay	1423.4		
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
4: Wilbur Avenue & SR 160 NB On

2030 PM & Proj no Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑			↑↱		↰		↱			
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	80	547	0	0	719	275	190	0	230	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	84	576	0	0	757	289	200	0	242	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1046			576			1123	1791	288	1358	1646	523
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1046			576			1123	1791	288	1358	1646	523
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	87			100			0	100	66	100	100	100
cM capacity (veh/h)	661			994			145	70	709	64	86	499

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2
Volume Total	84	288	288	505	542	200	242
Volume Left	84	0	0	0	0	200	0
Volume Right	0	0	0	0	289	0	242
cSH	661	1700	1700	1700	1700	145	709
Volume to Capacity	0.13	0.17	0.17	0.30	0.32	1.38	0.34
Queue Length 95th (ft)	11	0	0	0	0	319	38
Control Delay (s)	11.2	0.0	0.0	0.0	0.0	266.7	12.7
Lane LOS	B					F	B
Approach Delay (s)	1.4			0.0		127.6	
Approach LOS						F	

Intersection Summary			
Average Delay	26.7		
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
5: Wilbur Avenue & Bridgehead Road

2030 PM & Proj no Ramps
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	30	506	240	30	533	10	441	30	130	10	30	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	533	253	32	561	11	464	32	137	11	32	21

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1
Volume Total (vph)	32	785	603	633	63
Volume Left (vph)	32	0	32	464	11
Volume Right (vph)	0	253	11	137	21
Hadj (s)	0.53	-0.19	0.03	0.05	-0.13
Departure Headway (s)	8.5	7.7	7.5	7.4	9.4
Degree Utilization, x	0.07	1.69	1.26	1.31	0.16
Capacity (veh/h)	416	470	486	493	378
Control Delay (s)	10.9	336.8	157.0	175.5	14.2
Approach Delay (s)	324.2		157.0	175.5	14.2
Approach LOS	F		F	F	B

Intersection Summary			
Delay	222.8		
HCM Level of Service	F		
Intersection Capacity Utilization	100.5%	ICU Level of Service	G
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
6: E 18th Street & Hillcrest Avenue

2030 PM & Proj no Ramps
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑	↱	↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3426		1770	3491		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3426		1770	3491		1770	1863	1583	1770	1863	1583
Volume (vph)	20	370	100	256	506	50	230	100	220	50	120	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	389	105	269	533	53	242	105	232	53	126	63
RTOR Reduction (vph)	0	26	0	0	7	0	0	0	164	0	0	54
Lane Group Flow (vph)	21	468	0	269	579	0	242	105	68	53	126	9
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases									8			4
Actuated Green, G (s)	1.3	17.2		13.7	30.1		12.7	19.4	19.4	2.6	8.8	8.8
Effective Green, g (s)	2.3	19.2		15.2	32.1		14.2	20.9	20.9	3.6	10.3	10.3
Actuated g/C Ratio	0.03	0.27		0.21	0.45		0.20	0.29	0.29	0.05	0.15	0.15
Clearance Time (s)	4.0	5.0		4.5	5.0		4.5	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	57	928		379	1581		354	549	467	90	271	230
v/s Ratio Prot	0.01	c0.14		c0.15	0.17		c0.14	0.06		0.03	c0.07	
v/s Ratio Perm									0.04			0.01
v/c Ratio	0.37	0.50		0.71	0.37		0.68	0.19	0.15	0.59	0.46	0.04
Uniform Delay, d1	33.6	21.8		25.8	12.7		26.3	18.7	18.4	32.9	27.8	26.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.0	0.4		6.0	0.1		5.4	0.2	0.1	9.5	1.3	0.1
Delay (s)	37.6	22.3		31.8	12.9		31.6	18.9	18.6	42.4	29.0	26.1
Level of Service	D	C		C	B		C	B	B	D	C	C
Approach Delay (s)		22.9			18.8			24.1			31.2	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM Average Control Delay	22.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	70.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
7: E 18th Street & Viera Avenue

2030 PM & Proj no Ramps
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↱			↰	↱		✣	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	0.96			1.00	0.85		0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00		0.99	
Satd. Flow (prot)	1770	3539	1583	1770	3413			1788	1583		1693	
Flt Permitted	0.31	1.00	1.00	0.51	1.00			0.69	1.00		0.89	
Satd. Flow (perm)	568	3539	1583	958	3413			1294	1583		1532	
Volume (vph)	110	384	60	20	596	185	150	30	40	36	20	80
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	116	404	63	21	627	195	158	32	42	38	21	84
RTOR Reduction (vph)	0	0	25	0	43	0	0	0	30	0	61	0
Lane Group Flow (vph)	116	404	38	21	779	0	0	190	12	0	82	0
Turn Type	Perm		Perm	Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	29.1	29.1	29.1	29.1	29.1			12.7	12.7		12.7	
Effective Green, g (s)	30.1	30.1	30.1	30.1	30.1			13.7	13.7		13.7	
Actuated g/C Ratio	0.60	0.60	0.60	0.60	0.60			0.28	0.28		0.28	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	343	2139	957	579	2063			356	435		421	
v/s Ratio Prot		0.11			c0.23							
v/s Ratio Perm	0.20		0.02	0.02				c0.15	0.01		0.05	
v/c Ratio	0.34	0.19	0.04	0.04	0.38			0.53	0.03		0.20	
Uniform Delay, d1	4.9	4.4	4.0	4.0	5.0			15.3	13.2		13.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.6	0.0	0.0	0.0	0.1			1.5	0.0		0.2	
Delay (s)	5.5	4.4	4.0	4.0	5.2			16.9	13.2		14.1	
Level of Service	A	A	A	A	A			B	B		B	
Approach Delay (s)		4.6			5.1			16.2			14.1	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	49.8	Sum of lost time (s)	6.0
Intersection Capacity Utilization	55.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: E 18th Street & Phillips Lane

2030 PM & Proj no Ramps
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱	↰	↱		↰↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.97	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.90		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3526		1770	3539	1583	1770	1679		3433	1631	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3526		1770	3539	1583	1770	1679		3433	1631	
Volume (vph)	80	409	10	20	767	70	20	10	20	40	10	50
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	431	11	21	807	74	21	11	21	42	11	53
RTOR Reduction (vph)	0	2	0	0	0	46	0	18	0	0	43	0
Lane Group Flow (vph)	84	440	0	21	807	28	21	14	0	42	21	0
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	5	2		1	6		4	7		8	3	
Permitted Phases						6						
Actuated Green, G (s)	3.7	20.2		0.5	17.0	17.0	0.5	7.1		1.7	8.3	
Effective Green, g (s)	3.7	20.2		0.5	17.0	17.0	0.5	7.1		1.7	8.3	
Actuated g/C Ratio	0.08	0.44		0.01	0.37	0.37	0.01	0.16		0.04	0.18	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	144	1565		19	1322	591	19	262		128	298	
v/s Ratio Prot	c0.05	c0.12		0.01	c0.23		0.01	0.01		c0.01	c0.01	
v/s Ratio Perm						0.02						
v/c Ratio	0.58	0.28		1.11	0.61	0.05	1.11	0.05		0.33	0.07	
Uniform Delay, d1	20.2	8.0		22.5	11.6	9.1	22.5	16.3		21.3	15.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.9	0.1		242.0	0.8	0.0	242.0	0.1		1.5	0.1	
Delay (s)	26.1	8.1		264.5	12.4	9.1	264.5	16.4		22.8	15.5	
Level of Service	C	A		F	B	A	F	B		C	B	
Approach Delay (s)		11.0			18.0			114.7			18.4	
Approach LOS		B			B			F			B	

Intersection Summary			
HCM Average Control Delay	18.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	45.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	43.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

9: E 18th Street & SR 160 SB Off

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰↰	↑↑	↱		↰	↱	↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85		1.00	0.85	1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1719	3380		3335	3438	1538		1729	1538	1719	1646	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.70	1.00	0.48	1.00	
Satd. Flow (perm)	1719	3380		3335	3438	1538		1269	1538	861	1646	
Volume (vph)	10	399	50	985	687	90	150	10	199	40	20	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	420	53	1037	723	95	158	11	209	42	21	32
RTOR Reduction (vph)	0	9	0	0	0	28	0	0	0	0	27	0
Lane Group Flow (vph)	11	464	0	1037	723	67	0	169	209	42	26	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot		Perm	Perm		Free	Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases						6	8		Free	4		
Actuated Green, G (s)	0.8	26.7		43.2	69.1	69.1		17.1	100.0	17.1	17.1	
Effective Green, g (s)	0.8	27.7		43.2	70.1	70.1		17.1	100.0	17.1	17.1	
Actuated g/C Ratio	0.01	0.28		0.43	0.70	0.70		0.17	1.00	0.17	0.17	
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0		4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	4.0	4.0		2.0		2.0	2.0	
Lane Grp Cap (vph)	14	936		1441	2410	1078		217	1538	147	281	
v/s Ratio Prot	0.01	c0.14		c0.31	0.21						0.02	
v/s Ratio Perm						0.04		c0.13	0.14	0.05		
v/c Ratio	0.79	0.50		0.72	0.30	0.06		0.78	0.14	0.29	0.09	
Uniform Delay, d1	49.5	30.3		23.4	5.7	4.7		39.6	0.0	36.1	34.9	
Progression Factor	1.00	1.00		0.54	0.71	0.48		1.00	1.00	1.00	1.00	
Incremental Delay, d2	130.6	1.9		1.6	0.3	0.1		14.8	0.2	0.4	0.1	
Delay (s)	180.1	32.2		14.2	4.3	2.3		54.4	0.2	36.5	35.0	
Level of Service	F	C		B	A	A		D	A	D	C	
Approach Delay (s)		35.5			9.7			24.4			35.7	
Approach LOS		D			A			C			D	

Intersection Summary			
HCM Average Control Delay	17.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

10: Main Street & SR 160 NB On

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↱		↰	↑↑↑	↰	↱↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		1.00	0.91	1.00	0.88
Frt	0.97		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	4801		1719	4940	1719	2707
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	4801		1719	4940	1719	2707
Volume (vph)	518	120	148	1612	150	1162
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	545	126	156	1697	158	1223
RTOR Reduction (vph)	34	0	0	0	0	40
Lane Group Flow (vph)	637	0	156	1697	158	1183
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Turn Type			Prot			pm+ov
Protected Phases	2		1	6	8	1
Permitted Phases						8
Actuated Green, G (s)	30.8		42.0	77.8	13.2	55.2
Effective Green, g (s)	31.8		43.0	78.8	13.2	56.2
Actuated g/C Ratio	0.32		0.43	0.79	0.13	0.56
Clearance Time (s)	5.0		5.0	5.0	4.0	5.0
Vehicle Extension (s)	4.0		3.0	4.0	2.0	3.0
Lane Grp Cap (vph)	1527		739	3893	227	1630
v/s Ratio Prot	0.13		0.09	c0.34	0.09	c0.31
v/s Ratio Perm						0.12
v/c Ratio	0.42		0.21	0.44	0.70	0.73
Uniform Delay, d1	26.8		17.9	3.4	41.5	16.2
Progression Factor	0.32		1.10	0.38	1.00	1.00
Incremental Delay, d2	0.8		0.1	0.3	7.3	1.6
Delay (s)	9.4		19.7	1.6	48.8	17.8
Level of Service	A		B	A	D	B
Approach Delay (s)	9.4			3.1	21.4	
Approach LOS	A			A	C	

Intersection Summary			
HCM Average Control Delay	10.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

11: Main Street & Bridgehead Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↑	↱	↰↰	↱		↰↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00	0.97	1.00		0.97	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	4839		1719	4940	1538	3335	1755		3335	1810	1538
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1719	4839		1719	4940	1538	3335	1755		3335	1810	1538
Volume (vph)	206	1275	200	80	1291	389	310	239	60	111	254	159
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	217	1342	211	84	1359	409	326	252	63	117	267	167
RTOR Reduction (vph)	0	18	0	0	0	257	0	10	0	0	0	144
Lane Group Flow (vph)	217	1535	0	84	1359	152	326	305	0	117	267	23
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot		Perm	Split			Split		Perm
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases						6						7
Actuated Green, G (s)	12.0	42.1		6.0	36.1	36.1	20.9	20.9		14.0	14.0	14.0
Effective Green, g (s)	12.0	43.1		6.0	37.1	37.1	20.9	20.9		14.0	14.0	14.0
Actuated g/C Ratio	0.12	0.43		0.06	0.37	0.37	0.21	0.21		0.14	0.14	0.14
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	206	2086		103	1833	571	697	367		467	253	215
v/s Ratio Prot	c0.13	c0.32		0.05	0.28		0.10	c0.17		0.04	c0.15	
v/s Ratio Perm						0.10						0.02
v/c Ratio	1.05	0.74		0.82	0.74	0.27	0.47	0.83		0.25	1.06	0.11
Uniform Delay, d1	44.0	23.7		46.5	27.3	21.9	34.7	37.9		38.3	43.0	37.6
Progression Factor	0.85	0.93		1.34	0.25	0.57	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	69.6	1.8		31.9	2.4	1.0	0.2	14.1		0.1	71.9	0.1
Delay (s)	107.2	23.8		94.0	9.4	13.4	34.9	51.9		38.4	114.9	37.6
Level of Service	F	C		F	A	B	C	D		D	F	D
Approach Delay (s)		34.1			14.1			43.2			75.2	
Approach LOS		C			B			D			E	

Intersection Summary			
HCM Average Control Delay	32.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

12: Main Street & Sandy Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↱		↰	↑	↱	↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	4908		1719	4922		1719	1863	1538	1770	1604	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	4908		1719	4922		1719	1863	1538	1770	1604	
Volume (vph)	45	1342	60	50	1704	54	20	3	50	50	3	36
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	47	1413	63	53	1794	57	21	3	53	53	3	38
RTOR Reduction (vph)	0	3	0	0	2	0	0	0	49	0	34	0
Lane Group Flow (vph)	47	1473	0	53	1849	0	21	3	4	53	7	0
Heavy Vehicles (%)	2%	5%	5%	5%	5%	2%	5%	2%	5%	2%	2%	2%
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8			
Actuated Green, G (s)	5.8	58.9		11.4	64.5		2.0	7.1	7.1	5.6	10.2	
Effective Green, g (s)	5.8	59.4		11.9	65.5		2.0	7.1	7.1	5.6	10.7	
Actuated g/C Ratio	0.06	0.59		0.12	0.66		0.02	0.07	0.07	0.06	0.11	
Clearance Time (s)	4.0	4.5		4.5	5.0		4.0	4.0	4.0	4.0	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	103	2915		205	3224		34	132	109	99	172	
v/s Ratio Prot	0.03	c0.30		0.03	c0.38		0.01	0.00		c0.03	c0.00	
v/s Ratio Perm									0.00			
v/c Ratio	0.46	0.51		0.26	0.57		0.62	0.02	0.03	0.54	0.04	
Uniform Delay, d1	45.6	11.8		40.0	9.5		48.6	43.2	43.3	45.9	40.0	
Progression Factor	0.61	1.24		0.40	0.03		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.3	0.4		0.6	0.7		29.0	0.1	0.1	5.5	0.1	
Delay (s)	30.1	15.1		16.5	0.9		77.6	43.3	43.4	51.4	40.1	
Level of Service	C	B		B	A		E	D	D	D	D	
Approach Delay (s)		15.6			1.4			52.7			46.5	
Approach LOS		B			A			D			D	

Intersection Summary			
HCM Average Control Delay	9.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	56.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
13: Main Street & Live Oak Ave

2030 PM & Proj no Ramps
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑	↱	↰	↑↑↱		↰	↑↱		↰↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91		1.00	0.95		0.97	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	4940	1538	1719	4838		1719	3457		3433	3449	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	4940	1538	1719	4838		1719	3457		3433	3449	
Volume (vph)	221	1117	122	97	1602	326	184	517	77	156	284	58
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	233	1176	128	102	1686	343	194	544	81	164	299	61
RTOR Reduction (vph)	0	0	72	0	30	0	0	12	0	0	17	0
Lane Group Flow (vph)	233	1176	56	102	1999	0	194	613	0	164	343	0
Heavy Vehicles (%)	2%	5%	5%	5%	5%	2%	5%	2%	5%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2		6							
Actuated Green, G (s)	12.8	42.9	42.9	9.6	39.7		15.3	22.2		8.3	14.2	
Effective Green, g (s)	12.8	43.9	43.9	9.6	40.7		16.3	22.2		8.3	14.2	
Actuated g/C Ratio	0.13	0.44	0.44	0.10	0.41		0.16	0.22		0.08	0.14	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		5.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	227	2169	675	165	1969		280	767		285	490	
v/s Ratio Prot	c0.13	0.24		0.06	c0.41		c0.11	c0.18		0.05	0.10	
v/s Ratio Perm			0.04									
v/c Ratio	1.03	0.54	0.08	0.62	1.02		0.69	0.80		0.58	0.70	
Uniform Delay, d1	43.6	20.7	16.3	43.4	29.6		39.5	36.8		44.2	40.9	
Progression Factor	1.01	0.52	0.20	0.97	0.48		1.00	1.00		1.00	1.00	
Incremental Delay, d2	65.5	0.9	0.2	6.0	22.9		7.2	5.8		2.8	4.3	
Delay (s)	109.7	11.7	3.6	48.2	37.1		46.7	42.6		47.0	45.2	
Level of Service	F	B	A	D	D		D	D		D	D	
Approach Delay (s)		25.9			37.6			43.6			45.8	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM Average Control Delay	35.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
14: Main Street & Big Break Road

2030 PM & Proj no Ramps
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↱			↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.97	1.00
Satd. Flow (prot)	1770	3438	1583	1770	3438	1583	1770	1723			1799	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.50	1.00			0.76	1.00
Satd. Flow (perm)	1770	3438	1583	1770	3438	1583	926	1723			1419	1583
Volume (vph)	201	1085	60	60	1763	80	90	20	20	100	40	180
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	212	1142	63	63	1856	84	95	21	21	105	42	189
RTOR Reduction (vph)	0	0	21	0	0	27	0	18	0	0	0	162
Lane Group Flow (vph)	212	1142	42	63	1856	57	95	24	0	0	147	27
Heavy Vehicles (%)	2%	5%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot		custom	Prot		custom	Perm			Perm		Perm
Protected Phases	5			1				3			7	
Permitted Phases		2	2		6	6	3			7		7
Actuated Green, G (s)	14.9	66.1	66.1	6.5	57.7	57.7	13.4	13.4			13.4	13.4
Effective Green, g (s)	14.9	67.1	67.1	6.5	58.7	58.7	14.4	14.4			14.4	14.4
Actuated g/C Ratio	0.15	0.67	0.67	0.06	0.59	0.59	0.14	0.14			0.14	0.14
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0	5.0	5.0	5.0			5.0	5.0
Vehicle Extension (s)	3.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)	264	2307	1062	115	2018	929	133	248			204	228
v/s Ratio Prot	c0.12			0.04				0.01				
v/s Ratio Perm		0.33	0.03		c0.54	0.04	0.10				c0.10	0.02
v/c Ratio	0.80	0.50	0.04	0.55	0.92	0.06	0.71	0.10			0.72	0.12
Uniform Delay, d1	41.1	8.1	5.6	45.3	18.5	8.8	40.8	37.2			40.9	37.3
Progression Factor	0.71	0.21	0.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	15.6	0.7	0.1	2.8	8.3	0.1	14.0	0.1			10.1	0.1
Delay (s)	44.9	2.5	0.1	48.2	26.8	9.0	54.9	37.2			51.0	37.4
Level of Service	D	A	A	D	C	A	D	D			D	D
Approach Delay (s)		8.7			26.8			49.5			43.3	
Approach LOS		A			C			D			D	

Intersection Summary			
HCM Average Control Delay	22.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
15: Oakley Road & Neroly Road

2030 PM & Proj no Ramps
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	20	77	30	20	226	153	200	416	20	93	361	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	81	32	21	238	161	211	438	21	98	380	21

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	134	420	669	499
Volume Left (vph)	21	21	211	98
Volume Right (vph)	32	161	21	21
Hadj (s)	-0.08	-0.19	0.08	0.05
Departure Headway (s)	9.2	7.7	7.7	7.7
Degree Utilization, x	0.34	0.90	1.43	1.06
Capacity (veh/h)	366	464	469	476
Control Delay (s)	16.9	47.6	228.8	87.6
Approach Delay (s)	16.9	47.6	228.8	87.6
Approach LOS	C	E	F	F

Intersection Summary			
Delay	127.2		
HCM Level of Service	F		
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
16: Oakley Road & Live Oak Ave

2030 PM & Proj no Ramps
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	28	160	20	70	280	213	50	516	50	115	301	37
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	29	168	21	74	295	224	53	543	53	121	317	39

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	219	593	648	477
Volume Left (vph)	29	74	53	121
Volume Right (vph)	21	224	53	39
Hadj (s)	0.00	-0.17	0.00	0.04
Departure Headway (s)	9.6	8.3	8.5	8.5
Degree Utilization, x	0.58	1.37	1.53	1.13
Capacity (veh/h)	366	437	428	426
Control Delay (s)	25.1	204.2	271.9	112.4
Approach Delay (s)	25.1	204.2	271.9	112.4
Approach LOS	D	F	F	F

Intersection Summary			
Delay	184.0		
HCM Level of Service	F		
Intersection Capacity Utilization	100.7%	ICU Level of Service	G
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
17: Oakley Road & Empire Avenue

2030 PM & Proj no Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↑	↱		↰↑	↱	↰	↑↑↱		↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95		1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1696	1583		1804	1583	1770	3524		1770	1863	1583
Flt Permitted	0.95	0.96	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1696	1583		1804	1583	1770	3524		1770	1863	1583
Volume (vph)	140	10	225	20	10	20	433	684	20	50	417	110
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	147	11	237	21	11	21	456	720	21	53	439	116
RTOR Reduction (vph)	0	0	220	0	0	20	0	2	0	0	0	78
Lane Group Flow (vph)	77	81	17	0	32	1	456	739	0	53	439	38
Turn Type	Split		Perm	Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8						6
Actuated Green, G (s)	5.3	5.3	5.3		4.0	4.0	21.4	41.2		2.6	22.4	22.4
Effective Green, g (s)	5.3	5.3	5.3		5.0	5.0	22.4	42.2		3.6	23.4	23.4
Actuated g/C Ratio	0.07	0.07	0.07		0.07	0.07	0.31	0.59		0.05	0.32	0.32
Clearance Time (s)	4.0	4.0	4.0		5.0	5.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	124	125	116		125	110	550	2063		88	605	514
v/s Ratio Prot	0.05	c0.05			c0.02		c0.26	0.21		0.03	c0.24	
v/s Ratio Perm			0.01			0.00						0.02
v/c Ratio	0.62	0.65	0.15		0.26	0.01	0.83	0.36		0.60	0.73	0.07
Uniform Delay, d1	32.4	32.5	31.3		31.8	31.3	23.1	7.8		33.5	21.5	16.8
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	9.3	11.0	0.6		1.1	0.0	10.0	0.1		11.1	4.3	0.1
Delay (s)	41.7	43.5	31.9		32.9	31.3	33.1	8.0		44.6	25.8	16.9
Level of Service	D	D	C		C	C	C	A		D	C	B
Approach Delay (s)		36.2			32.3			17.5			25.8	
Approach LOS		D			C			B			C	

Intersection Summary			
HCM Average Control Delay	23.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	72.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: Main Street & Charles Way

2030 PM & Proj no Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑↱		↰↰	↑	↱		↰↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.98	1.00
Satd. Flow (prot)	1719	3539	1538	1770	3531		3335	1810	1583		1797	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.98	1.00
Satd. Flow (perm)	1719	3539	1538	1770	3531		3335	1810	1583		1797	1538
Volume (vph)	20	868	277	260	1323	20	564	20	260	20	40	50
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	914	292	274	1393	21	594	21	274	21	42	53
RTOR Reduction (vph)	0	0	195	0	1	0	0	0	206	0	0	51
Lane Group Flow (vph)	21	914	97	274	1413	0	594	21	68	0	63	2
Heavy Vehicles (%)	5%	2%	5%	2%	2%	2%	5%	5%	2%	2%	5%	5%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	1.5	24.8	24.8	12.3	35.6		18.2	18.2	18.2		3.0	3.0
Effective Green, g (s)	2.5	25.8	25.8	13.3	36.6		19.2	19.2	19.2		3.0	3.0
Actuated g/C Ratio	0.03	0.33	0.33	0.17	0.47		0.25	0.25	0.25		0.04	0.04
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	56	1181	513	305	1672		828	450	393		70	60
v/s Ratio Prot	0.01	0.26		c0.15	c0.40		c0.18	0.01			c0.04	
v/s Ratio Perm			0.06						0.04			0.00
v/c Ratio	0.38	0.77	0.19	0.90	0.85		0.72	0.05	0.17		0.90	0.03
Uniform Delay, d1	36.6	23.1	18.3	31.3	17.9		26.6	22.1	22.8		37.0	35.8
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	4.2	3.2	0.2	27.0	4.1		3.0	0.0	0.2		73.7	0.2
Delay (s)	40.8	26.4	18.5	58.4	22.0		29.6	22.1	23.0		110.7	36.0
Level of Service	D	C	B	E	C		C	C	C		F	D
Approach Delay (s)		24.7			27.9			27.4			76.6	
Approach LOS		C			C			C			E	

Intersection Summary			
HCM Average Control Delay	28.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	77.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
19: Main Street & Vintage Parkway

2030 PM & Proj no Ramps
11/6/2006

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑	↑↑↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3507		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3539	3507		1770	1583
Volume (vph)	96	522	616	40	60	37
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	101	549	648	42	63	39
RTOR Reduction (vph)	0	0	5	0	0	35
Lane Group Flow (vph)	101	549	685	0	63	4
Turn Type	Prot					Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	4.8	42.3	33.5		6.3	6.3
Effective Green, g (s)	4.8	43.3	34.5		6.3	6.3
Actuated g/C Ratio	0.08	0.75	0.60		0.11	0.11
Clearance Time (s)	4.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	148	2660	2101		194	173
v/s Ratio Prot	c0.06	0.16	c0.20		c0.04	
v/s Ratio Perm						0.00
v/c Ratio	0.68	0.21	0.33		0.32	0.02
Uniform Delay, d1	25.7	2.1	5.8		23.7	22.9
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	12.2	0.0	0.1		1.0	0.1
Delay (s)	37.9	2.1	5.8		24.7	23.0
Level of Service	D	A	A		C	C
Approach Delay (s)		7.7	5.8		24.0	
Approach LOS		A	A		C	

Intersection Summary			
HCM Average Control Delay	8.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	57.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	37.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: Main Street & O'Hara Avenue

2030 PM & Proj no Ramps
11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑↱			↰↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.91			0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1770	1863	1583	1770	1853		1770	1695			1826	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.67	1.00			0.95	
Satd. Flow (perm)	1770	1863	1583	1770	1853		1256	1695			1741	
Volume (vph)	10	504	108	40	554	20	142	40	60	20	90	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	531	114	42	583	21	149	42	63	21	95	11
RTOR Reduction (vph)	0	0	49	0	2	0	0	50	0	0	6	0
Lane Group Flow (vph)	11	531	65	42	602	0	149	55	0	0	121	0
Turn Type	Prot		Perm	Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4				2			6		
Actuated Green, G (s)	0.7	35.3	35.3	2.0	36.6		12.9	12.9			13.4	
Effective Green, g (s)	0.7	36.3	36.3	2.0	37.6		13.4	13.4			13.4	
Actuated g/C Ratio	0.01	0.57	0.57	0.03	0.59		0.21	0.21			0.21	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		4.5	4.5			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	19	1062	902	56	1094		264	357			366	
v/s Ratio Prot	0.01	0.29		c0.02	c0.33			0.03				
v/s Ratio Perm			0.04				c0.12				0.07	
v/c Ratio	0.58	0.50	0.07	0.75	0.55		0.56	0.15			0.33	
Uniform Delay, d1	31.4	8.2	6.1	30.6	7.9		22.5	20.5			21.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	36.3	0.4	0.0	42.7	0.6		2.8	0.2			0.5	
Delay (s)	67.6	8.6	6.2	73.3	8.5		25.3	20.7			21.9	
Level of Service	E	A	A	E	A		C	C			C	
Approach Delay (s)		9.2			12.7			23.4			21.9	
Approach LOS		A			B			C			C	

Intersection Summary			
HCM Average Control Delay	13.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	63.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
21: Cypress Road & Empire Avenue

2030 PM & Proj no Ramps
11/6/2006

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↱		↰	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3479		1770	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	3479		1770	3539
Volume (vph)	210	251	927	120	144	568
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	221	264	976	126	152	598
RTOR Reduction (vph)	0	203	15	0	0	0
Lane Group Flow (vph)	221	61	1087	0	152	598
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	11.7	11.7	22.1		5.3	31.4
Effective Green, g (s)	12.2	12.2	23.1		5.3	32.4
Actuated g/C Ratio	0.23	0.23	0.44		0.10	0.62
Clearance Time (s)	4.5	4.5	5.0		4.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	411	367	1528		178	2180
v/s Ratio Prot	c0.12		c0.31		c0.09	0.17
v/s Ratio Perm		0.04				
v/c Ratio	0.54	0.17	0.71		0.85	0.27
Uniform Delay, d1	17.7	16.1	12.0		23.3	4.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.4	0.2	1.6		30.6	0.1
Delay (s)	19.1	16.4	13.6		53.9	4.7
Level of Service	B	B	B		D	A
Approach Delay (s)	17.6		13.6			14.7
Approach LOS	B		B			B

Intersection Summary			
HCM Average Control Delay	14.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	52.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
22: Cypress Road & Main Street

2030 PM & Proj no Ramps
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↱	↱	↰	↑↑	↱	↰↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	0.95	1.00	0.95	1.00	0.97	0.95	
Frt	1.00	0.97		1.00	0.92	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3428		1770	1637	1504	1770	3539	1583	3433	3529	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3428		1770	1637	1504	1770	3539	1583	3433	3529	
Volume (vph)	40	189	50	380	290	1100	90	594	220	434	510	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	199	53	400	305	1158	95	625	232	457	537	11
RTOR Reduction (vph)	0	27	0	0	38	36	0	0	45	0	1	0
Lane Group Flow (vph)	42	225	0	400	573	816	95	625	187	457	547	0
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		
Protected Phases	7	4		3	8	1	5	2	3	1	6	
Permitted Phases						8			2			
Actuated Green, G (s)	2.3	9.9		22.7	30.3	49.4	7.4	20.5	43.2	19.1	32.2	
Effective Green, g (s)	2.3	9.9		22.7	30.3	49.4	7.4	20.5	43.2	19.1	32.2	
Actuated g/C Ratio	0.03	0.11		0.26	0.34	0.56	0.08	0.23	0.49	0.22	0.37	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	46	385		456	562	842	149	823	775	743	1288	
v/s Ratio Prot	0.02	0.07		c0.23	c0.35	c0.21	0.05	c0.18	0.06	0.13	0.15	
v/s Ratio Perm						0.33			0.06			
v/c Ratio	0.91	0.59		0.88	1.02	0.97	0.64	0.76	0.24	0.62	0.42	
Uniform Delay, d1	42.9	37.2		31.4	29.0	18.7	39.1	31.6	13.0	31.2	21.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	99.4	2.3		17.1	43.0	23.4	8.6	4.1	0.2	1.5	0.2	
Delay (s)	142.2	39.5		48.5	71.9	42.0	47.7	35.6	13.2	32.7	21.3	
Level of Service	F	D		D	E	D	D	D	B	C	C	
Approach Delay (s)		54.1			53.2			31.4			26.5	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	41.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	88.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
23: Neroly Road & Live Oak Ave

2030 PM & Proj no Ramps
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↑↱			↰↑↑↱			↰↑↱			↰↑↱	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	20	271	95	120	193	337	277	206	120	229	62	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	285	100	126	203	355	292	217	126	241	65	21

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	164	243	228	456	635	327
Volume Left (vph)	21	0	126	0	292	241
Volume Right (vph)	0	100	0	355	126	21
Hadj (s)	0.10	-0.25	0.31	-0.51	0.01	0.14
Departure Headway (s)	9.4	9.0	9.1	8.3	8.5	9.0
Degree Utilization, x	0.43	0.61	0.58	1.05	1.49	0.82
Capacity (veh/h)	377	386	391	439	438	395
Control Delay (s)	17.9	23.8	22.7	85.9	256.0	41.5
Approach Delay (s)	21.5		64.9		256.0	41.5
Approach LOS	C		F		F	E

Intersection Summary			
Delay	111.6		
HCM Level of Service	F		
Intersection Capacity Utilization	74.6%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
24: Laurel Road & Live Oak Avenue

2030 PM & Proj no Ramps
11/6/2006

	↗	→	←	↖	↘	↙
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰↰	↑↑↑	↑↑↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	0.91	0.91		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3433	5085	4999		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	3433	5085	4999		1770	1583
Volume (vph)	562	1000	1790	228	135	485
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	592	1053	1884	240	142	511
RTOR Reduction (vph)	0	0	15	0	0	258
Lane Group Flow (vph)	592	1053	2109	0	142	253
Turn Type	Prot					Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	17.1	61.5	40.4		18.0	18.0
Effective Green, g (s)	17.1	62.5	41.4		19.0	19.0
Actuated g/C Ratio	0.19	0.70	0.46		0.21	0.21
Clearance Time (s)	4.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	656	3551	2312		376	336
v/s Ratio Prot	c0.17	0.21	c0.42		0.08	
v/s Ratio Perm						c0.16
v/c Ratio	0.90	0.30	0.91		0.38	0.75
Uniform Delay, d1	35.4	5.1	22.4		30.2	33.1
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	15.7	0.0	6.0		0.6	9.3
Delay (s)	51.1	5.2	28.4		30.8	42.3
Level of Service	D	A	C		C	D
Approach Delay (s)		21.7	28.4		39.8	
Approach LOS		C	C		D	

Intersection Summary			
HCM Average Control Delay	27.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	89.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

25: Laurel Road & Empire Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.98		1.00	0.99		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3448		1770	3455		1770	3495		1770	3229	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3448		1770	3455		1770	3495		1770	3229	
Volume (vph)	260	725	150	60	1388	261	170	556	50	51	328	460
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	274	763	158	63	1461	275	179	585	53	54	345	484
RTOR Reduction (vph)	0	13	0	0	12	0	0	5	0	0	176	0
Lane Group Flow (vph)	274	908	0	63	1724	0	179	633	0	54	653	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	19.0	71.1		7.7	59.8		12.0	32.0		4.8	24.8	
Effective Green, g (s)	19.0	71.1		7.7	59.8		12.0	32.0		4.8	24.8	
Actuated g/C Ratio	0.14	0.54		0.06	0.45		0.09	0.24		0.04	0.19	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	256	1863		104	1570		161	850		65	609	
v/s Ratio Prot	c0.15	0.26		0.04	c0.50		c0.10	0.18		0.03	c0.20	
v/s Ratio Perm												
v/c Ratio	1.07	0.49		0.61	1.10		1.11	0.74		0.83	1.07	
Uniform Delay, d1	56.3	18.9		60.5	35.9		59.8	46.0		63.0	53.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	76.1	0.2		9.6	54.5		104.1	3.6		56.7	57.3	
Delay (s)	132.4	19.1		70.1	90.4		163.9	49.6		119.7	110.7	
Level of Service	F	B		E	F		F	D		F	F	
Approach Delay (s)		45.1			89.7			74.6			111.3	
Approach LOS		D			F			E			F	

Intersection Summary			
HCM Average Control Delay	79.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	131.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	107.7%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

26: Proj Dwy & Bridgehead Road

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑	↱	↰	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	1863	1583	1770	1863
Volume (vph)	62	32	759	75	39	461
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	65	34	799	79	41	485
RTOR Reduction (vph)	0	30	0	25	0	0
Lane Group Flow (vph)	65	4	799	54	41	485
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	6.7	6.7	46.5	46.5	2.2	53.2
Effective Green, g (s)	7.2	7.2	47.5	47.5	2.7	54.2
Actuated g/C Ratio	0.10	0.10	0.68	0.68	0.04	0.78
Clearance Time (s)	4.5	4.5	5.0	5.0	4.5	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	184	164	1275	1083	69	1455
v/s Ratio Prot	c0.04		c0.43		c0.02	0.26
v/s Ratio Perm		0.00		0.03		
v/c Ratio	0.35	0.02	0.63	0.05	0.59	0.33
Uniform Delay, d1	28.9	27.9	6.1	3.6	32.8	2.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	0.1	1.0	0.0	13.0	0.1
Delay (s)	30.1	28.0	7.0	3.6	45.8	2.4
Level of Service	C	C	A	A	D	A
Approach Delay (s)	29.4		6.7			5.8
Approach LOS	C		A			A

Intersection Summary			
HCM Average Control Delay	7.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	69.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	50.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

27: Main Street & Proj Dwy Center

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑↑	↑↑↑	↱	↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	5085	5085	1583	1770	1583
Volume (vph)	29	1413	1785	58	48	24
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	31	1487	1879	61	51	25
RTOR Reduction (vph)	0	0	0	16	0	23
Lane Group Flow (vph)	31	1487	1879	45	51	2
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	7.8	85.0	73.2	73.2	7.0	7.0
Effective Green, g (s)	7.8	85.0	73.2	73.2	7.0	7.0
Actuated g/C Ratio	0.08	0.85	0.73	0.73	0.07	0.07
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	138	4322	3722	1159	124	111
v/s Ratio Prot	0.02	c0.29	c0.37		c0.03	
v/s Ratio Perm				0.03		0.00
v/c Ratio	0.22	0.34	0.50	0.04	0.41	0.02
Uniform Delay, d1	43.3	1.6	5.7	3.7	44.5	43.3
Progression Factor	0.41	0.23	0.07	0.00	1.00	1.00
Incremental Delay, d2	0.8	0.2	0.2	0.0	2.2	0.1
Delay (s)	18.3	0.6	0.5	0.0	46.7	43.3
Level of Service	B	A	A	A	D	D
Approach Delay (s)		0.9	0.5		45.6	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	1.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

28: Main Street & Proj Dwy East

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑↑	↑↑↑	↱	↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	5085	5085	1583	1770	1583
Volume (vph)	28	1321	1995	38	25	29
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	29	1391	2100	40	26	31
RTOR Reduction (vph)	0	0	0	9	0	30
Lane Group Flow (vph)	29	1391	2100	31	26	1
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		3	
Permitted Phases				6		3
Actuated Green, G (s)	4.9	87.4	78.5	78.5	4.6	4.6
Effective Green, g (s)	4.9	87.4	78.5	78.5	4.6	4.6
Actuated g/C Ratio	0.05	0.87	0.78	0.78	0.05	0.05
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	87	4444	3992	1243	81	73
v/s Ratio Prot	0.02	c0.27	c0.41		c0.01	
v/s Ratio Perm				0.02		0.00
v/c Ratio	0.33	0.31	0.53	0.03	0.32	0.02
Uniform Delay, d1	46.0	1.1	3.9	2.4	46.2	45.5
Progression Factor	1.49	0.27	0.07	0.03	1.00	1.00
Incremental Delay, d2	1.9	0.2	0.2	0.0	2.3	0.1
Delay (s)	70.5	0.4	0.5	0.1	48.5	45.7
Level of Service	E	A	A	A	D	D
Approach Delay (s)		1.9	0.5		46.9	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	1.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	48.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

29: Proj Dwy & Live Oak Ave

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		0.97	0.95		1.00	0.95	
Frt	1.00	0.87		1.00	0.98		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1613		1770	1820		3433	3502		1770	3519	
Flt Permitted	0.74	1.00		0.62	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1379	1613		1146	1820		3433	3502		1770	3519	
Volume (vph)	9	20	168	50	20	4	214	790	60	6	280	11
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	22	183	54	22	4	233	859	65	7	304	12
RTOR Reduction (vph)	0	156	0	0	3	0	0	7	0	0	4	0
Lane Group Flow (vph)	10	49	0	54	23	0	233	917	0	7	312	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	6.5	6.5		6.5	6.5		6.7	24.2		0.9	18.4	
Effective Green, g (s)	6.5	6.5		6.5	6.5		6.7	24.2		0.9	18.4	
Actuated g/C Ratio	0.15	0.15		0.15	0.15		0.15	0.56		0.02	0.42	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	206	240		171	271		528	1944		37	1485	
v/s Ratio Prot		0.03			0.01		c0.07	c0.26		0.00	0.09	
v/s Ratio Perm	0.01			c0.05								
v/c Ratio	0.05	0.21		0.32	0.08		0.44	0.47		0.19	0.21	
Uniform Delay, d1	15.9	16.3		16.6	16.0		16.8	5.8		21.0	8.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.4		1.1	0.1		0.6	0.2		2.5	0.1	
Delay (s)	16.0	16.7		17.6	16.1		17.3	6.0		23.5	8.1	
Level of Service	B	B		B	B		B	A		C	A	
Approach Delay (s)		16.7			17.1			8.3			8.4	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	43.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION     1 Minaker/Wilbur                    Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            20    5   10
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    20 ---  1.0   1.0  1.1  1.1   1.1 ---   10  RIGHT
                                                          STREET NAME:
THRU   380 ---> 2.1  (NO. OF LANES)   2.1<---  826  THRU  Wilbur

RIGHT   50 ---  1.1   1.1  1.1  1.0   1.0 ---   30  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 140    5   20                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Minaker
========================================================================
               ORIGINAL   ADJUSTED                 V/C     CRITICAL
   MOVEMENT      VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      20          0 *     1650     0.0000
    THRU (T)        5          5       1650     0.0030
    LEFT (L)      140        140       1650     0.0848
    T + L                    145       1650     0.0879     0.0879
------------------------------------------------------------------------
SB  RIGHT (R)      20          0 *     1650     0.0000
    THRU (T)        5          5       1650     0.0030
    LEFT (L)       10         10       1650     0.0061     0.0061
    T + L                     15       1650     0.0091
------------------------------------------------------------------------
EB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)      380        380       3300     0.1152
    LEFT (L)       20         20       1650     0.0121     0.0121
    T + R                    430       3300     0.1303
------------------------------------------------------------------------
WB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      826        826       3300     0.2503
    LEFT (L)       30         30       1650     0.0182
    T + R                    836       3300     0.2533     0.2533
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.36
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION     6 Hillcrest/18th St                 Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            60  120   50
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    20 ---  1.0   1.0  1.0  1.0   1.1 ---   50  RIGHT
                                                          STREET NAME:
THRU   370 ---> 2.1  (NO. OF LANES)   2.1<---  506  THRU  18th St

RIGHT  100 ---  1.1   1.0  1.0  1.0   1.0 ---  256  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 230  100  220                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Hillcrest
========================================================================
               ORIGINAL   ADJUSTED                 V/C     CRITICAL
   MOVEMENT      VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     220          0 *     1650     0.0000
    THRU (T)      100        100       1650     0.0606
    LEFT (L)      230        230       1650     0.1394     0.1394
------------------------------------------------------------------------
SB  RIGHT (R)      60         40 *     1650     0.0242
    THRU (T)      120        120       1650     0.0727     0.0727
    LEFT (L)       50         50       1650     0.0303
------------------------------------------------------------------------
EB  RIGHT (R)     100        100       1650     0.0606
    THRU (T)      370        370       3300     0.1121
    LEFT (L)       20         20       1650     0.0121
    T + R                    470       3300     0.1424     0.1424
------------------------------------------------------------------------
WB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)      506        506       3300     0.1533
    LEFT (L)      256        256       1650     0.1552     0.1552
    T + R                    556       3300     0.1685
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.51
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION     7 Viera/18th St                     Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       2-PHASE SIGNAL
-----------            80   20   36
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   110 ---  1.0   1.1  1.1  1.1   1.1 ---  185  RIGHT
                                                          STREET NAME:
THRU   384 ---> 2.0  (NO. OF LANES)   2.1<---  596  THRU  18th St

RIGHT   60 ---  1.0   1.1  1.1  1.0   1.0 ---   20  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 150   30   40                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Viera
========================================================================
               ORIGINAL   ADJUSTED                 V/C     CRITICAL
   MOVEMENT      VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      40         20 *     1800     0.0111
    THRU (T)       30         30       1800     0.0167
    LEFT (L)      150        150       1800     0.0833     0.0833
    T + L                    180       1800     0.1000
------------------------------------------------------------------------
SB  RIGHT (R)      80         80       1800     0.0444
    THRU (T)       20         20       1800     0.0111
    LEFT (L)       36         36       1800     0.0200
    T + R                    100       1800     0.0556
    T + L                     56       1800     0.0311
    T + R + L                136       1800     0.0756     0.0756
------------------------------------------------------------------------
EB  RIGHT (R)      60          0 *     1800     0.0000
    THRU (T)      384        384       3600     0.1067
    LEFT (L)      110        110       1800     0.0611     0.0611
------------------------------------------------------------------------
WB  RIGHT (R)     185        185       1800     0.1028
    THRU (T)      596        596       3600     0.1656
    LEFT (L)       20         20       1800     0.0111
    T + R                    781       3600     0.2169     0.2169
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.44
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION     8 Phillips Lane/18th Street         Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------            50   10   40
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    80 ---  1.0   1.1  1.1  2.0   1.0 ---   70  RIGHT
                                                          STREET NAME:
THRU   409 ---> 2.1  (NO. OF LANES)   2.0<---  767  THRU  18th Street

RIGHT   10 ---  1.1   1.0  1.1  1.1   1.0 ---   20  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  20   10   20                         Urb=N, Rur=B
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Phillips Lane
========================================================================
               ORIGINAL   ADJUSTED                 V/C     CRITICAL
   MOVEMENT      VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)       10         10       1650     0.0061
    LEFT (L)       20         20       1650     0.0121
    T + R                     30       1650     0.0182     0.0182
------------------------------------------------------------------------
SB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)       10         10       1650     0.0061
    LEFT (L)       40         40       3000     0.0133
    T + R                     60       1650     0.0364     0.0364
------------------------------------------------------------------------
EB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      409        409       3300     0.1239
    LEFT (L)       80         80       1650     0.0485     0.0485
    T + R                    419       3300     0.1270
------------------------------------------------------------------------
WB  RIGHT (R)      70         48 *     1650     0.0291
    THRU (T)      767        767       3300     0.2324     0.2324
    LEFT (L)       20         20       1650     0.0121
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.34
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION     9 SR 160 SB Ramp/Main Street        Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            30   20   40
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    10 ---  1.0   1.1  1.1  1.0   1.0 ---   90  RIGHT
                                                          STREET NAME:
THRU   399 ---> 2.1  (NO. OF LANES)   2.0<---  687  THRU  Main Street

RIGHT   50 ---  1.1   1.1  1.1  1.9   2.0 ---  985  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 150   10  199                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 SB Ramp
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      199        199       1650     0.1206
    THRU (T)        10         10       1650     0.0061
    LEFT (L)       150        150       1650     0.0909     0.0909
    T + L                     160       1650     0.0970
------------------------------------------------------------------------
SB  RIGHT (R)       30         30       1650     0.0182
    THRU (T)        20         20       1650     0.0121
    LEFT (L)        40         40       1650     0.0242
    T + R                      50       1650     0.0303     0.0303
------------------------------------------------------------------------
EB  RIGHT (R)       50         50       1650     0.0303
    THRU (T)       399        399       3300     0.1209
    LEFT (L)        10         10       1650     0.0061
    T + R                     449       3300     0.1361     0.1361
------------------------------------------------------------------------
WB  RIGHT (R)       90         50 *     1650     0.0303
    THRU (T)       687        687       3300     0.2082
    LEFT (L)       985        985       3000     0.3283     0.3283
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                          0.59
     INTERSECTION LEVEL OF SERVICE:                              A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION    10 SR 160 NB Ramp/Main Street        Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0    0    0
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  RIGHT
                                                          STREET NAME:
THRU   518 ---> 3.1  (NO. OF LANES)   3.0<--- 1612  THRU  Main Street

RIGHT  120 ---  1.1   1.0  0.0  2.5   1.0 ---  148  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 150    0 1162                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 NB Ramp
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     1162        893 *     3127     0.2856     0.2856
    LEFT (L)       150        150       1720     0.0872
------------------------------------------------------------------------
EB  RIGHT (R)      120        120       1720     0.0698
    THRU (T)       518        518       5160     0.1004
    T + R                     638       5160     0.1236
------------------------------------------------------------------------
WB  THRU (T)      1612       1612       5160     0.3124     0.3124
    LEFT (L)       148        148       1720     0.0860
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                          0.60
     INTERSECTION LEVEL OF SERVICE:                              A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION    11 Neroly/Main Street                Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------           159  254  111
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   206 ---  1.0   1.0  1.0  2.0   1.0 ---  389  RIGHT
                                                          STREET NAME:
THRU  1275 ---> 3.1  (NO. OF LANES)   3.0<--- 1291  THRU  Main Street

RIGHT  200 ---  1.1   2.0  1.1  1.1   1.0 ---   80  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 310  239   60                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Neroly
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)       60         60       1650     0.0364
    THRU (T)       239        239       1650     0.1448
    LEFT (L)       310        310       3000     0.1033
    T + R                     299       1650     0.1812     0.1812
------------------------------------------------------------------------
SB  RIGHT (R)      159          0 *     1650     0.0000
    THRU (T)       254        254       1650     0.1539     0.1539
    LEFT (L)       111        111       3000     0.0370
------------------------------------------------------------------------
EB  RIGHT (R)      200        200       1650     0.1212
    THRU (T)      1275       1275       4950     0.2576
    LEFT (L)       206        206       1650     0.1248     0.1248
    T + R                    1475       4950     0.2980
------------------------------------------------------------------------
WB  RIGHT (R)      389        328 *     1650     0.1988
    THRU (T)      1291       1291       4950     0.2608     0.2608
    LEFT (L)        80         80       1650     0.0485
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                          0.72
     INTERSECTION LEVEL OF SERVICE:                              C
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION    12 Sandy/Main Street                 Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            36    3   50
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    45 ---  1.0   1.1  1.1  1.0   1.1 ---   54  RIGHT
                                                          STREET NAME:
THRU  1342 ---> 3.1  (NO. OF LANES)   3.1<--- 1704  THRU  Main Street

RIGHT   60 ---  1.1   1.0  1.0  1.0   1.0 ---   50  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  20    3   50                         Urb=N, Rur=N
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Sandy
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)       50          0 *     1650     0.0000
    THRU (T)         3          3       1650     0.0018
    LEFT (L)        20         20       1650     0.0121     0.0121
------------------------------------------------------------------------
SB  RIGHT (R)       36         36       1650     0.0218
    THRU (T)         3          3       1650     0.0018
    LEFT (L)        50         50       1650     0.0303
    T + R                      39       1650     0.0236     0.0236
------------------------------------------------------------------------
EB  RIGHT (R)       60         60       1650     0.0364
    THRU (T)      1342       1342       4950     0.2711
    LEFT (L)        45         45       1650     0.0273     0.0273
    T + R                    1402       4950     0.2832
------------------------------------------------------------------------
WB  RIGHT (R)       54         54       1650     0.0327
    THRU (T)      1704       1704       4950     0.3442
    LEFT (L)        50         50       1650     0.0303
    T + R                    1758       4950     0.3552     0.3552
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                          0.42
     INTERSECTION LEVEL OF SERVICE:                              A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION    13 Live Oak/Main Street              Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            58  284  156
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   221 ---  1.0   1.1  2.1  2.0   1.1 ---  326  RIGHT
                                                          STREET NAME:
THRU  1117 ---> 3.0  (NO. OF LANES)  3.1<--- 1602  THRU  Main Street

RIGHT  122 ---  1.0   1.0  2.1  1.1   1.0 ---   97  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 184  517   77                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      77         77       1650     0.0467
    THRU (T)      517        517       3300     0.1567
    LEFT (L)      184        184       1650     0.1115
    T + R                    594       3300     0.1800    0.1800
------------------------------------------------------------------------
SB  RIGHT (R)      58         58       1650     0.0352
    THRU (T)      284        284       3300     0.0861
    LEFT (L)      156        156       3000     0.0520    0.0520
    T + R                    342       3300     0.1036
------------------------------------------------------------------------
EB  RIGHT (R)     122          0 *     1650     0.0000
    THRU (T)     1117       1117       4950     0.2257
    LEFT (L)      221        221       1650     0.1339    0.1339
------------------------------------------------------------------------
WB  RIGHT (R)     326        326       1650     0.1976
    THRU (T)     1602       1602       4950     0.3236
    LEFT (L)       97         97       1650     0.0588
    T + R                   1928       4950     0.3895    0.3895
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.76
     INTERSECTION LEVEL OF SERVICE:                             C
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION    14 Big Break/Main Street             Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------           180   40  100
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   201 ---  1.0   1.0  1.1  1.1   1.0 ---   80  RIGHT
                                                          STREET NAME:
THRU  1085 ---> 2.0  (NO. OF LANES)  2.0<--- 1763  THRU  Main Street

RIGHT   60 ---  1.0   1.0  1.1  1.1   1.0 ---   60  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  90   20   20                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Big Break
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)       20         20       1650     0.0121
    LEFT (L)       90         90       1650     0.0545    0.0545
    T + R                     40       1650     0.0242
------------------------------------------------------------------------
SB  RIGHT (R)     180          0 *     1650     0.0000
    THRU (T)       40         40       1650     0.0242
    LEFT (L)      100        100       1650     0.0606
    T + L                    140       1650     0.0848    0.0848
------------------------------------------------------------------------
EB  RIGHT (R)      60          0 *     1650     0.0000
    THRU (T)     1085       1085       3300     0.3288
    LEFT (L)      201        201       1650     0.1218    0.1218
------------------------------------------------------------------------
WB  RIGHT (R)      80          0 *     1650     0.0000
    THRU (T)     1763       1763       3300     0.5342    0.5342
    LEFT (L)       60         60       1650     0.0364
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.80
     INTERSECTION LEVEL OF SERVICE:                             C
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION    17 Empire Ave/Oakley Road            Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------           110  417   50
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? Y
LEFT   140 ---  2.1   1.0  1.0  1.0   1.0 ---   20  RIGHT
                                                          STREET NAME:
THRU    10 ---> 1.1  (NO. OF LANES)  1.1<---   10  THRU  Oakley Road

RIGHT  225 ---  1.0   1.0  2.1  1.1   1.1 ---   20  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 433  684   20                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire Ave
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)      684        684       3300     0.2073
    LEFT (L)      433        433       1650     0.2624    0.2624
    T + R                    704       3300     0.2133
------------------------------------------------------------------------
SB  RIGHT (R)     110         33 *     1650     0.0200
    THRU (T)      417        417       1650     0.2527    0.2527
    LEFT (L)       50         50       1650     0.0303
------------------------------------------------------------------------
EB  RIGHT (R)     225          0 *     1650     0.0000
    THRU (T)       10         10       1650     0.0061
    LEFT (L)      140        140       3000     0.0467
    T + L                    150       3000     0.0500    0.0500
------------------------------------------------------------------------
WB  RIGHT (R)      20          0 *     1650     0.0000
    THRU (T)       10         10       1650     0.0061
    LEFT (L)       20         20       1650     0.0121
    T + L                     30       1650     0.0182    0.0182
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.58
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION    18 Empire Avenue/Main Street         Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------            50   40   20
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    20 ---  1.0   1.0  1.1  1.1   1.1 ---   20  RIGHT
                                                          STREET NAME:
THRU   868 ---> 2.0  (NO. OF LANES)  2.1<--- 1323  THRU  Main Street

RIGHT  277 ---  1.0   2.0  1.0  1.0   1.0 ---  260  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 564   20  260                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Empire Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     260          0 *     1650     0.0000
    THRU (T)       20         20       1650     0.0121
    LEFT (L)      564        564       3000     0.1880    0.1880
------------------------------------------------------------------------
SB  RIGHT (R)      50         30 *     1650     0.0182
    THRU (T)       40         40       1650     0.0242
    LEFT (L)       20         20       1650     0.0121
    T + L                     60       1650     0.0364    0.0364
------------------------------------------------------------------------
EB  RIGHT (R)     277          0 *     1650     0.0000
    THRU (T)      868        868       3300     0.2630    0.2630
    LEFT (L)       20         20       1650     0.0121
------------------------------------------------------------------------
WB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)     1323       1323       3300     0.4009
    LEFT (L)      260        260       1650     0.1576    0.1576
    T + R                   1343       3300     0.4070
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.65
     INTERSECTION LEVEL OF SERVICE:                             B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION    19 Vintage/Main Street               Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------            37    0   60
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    96 ---  1.0   1.0  0.0  1.0   1.1 ---   40  RIGHT
                                                          STREET NAME:
THRU   522 ---> 2.0  (NO. OF LANES)   2.1<---  616  THRU  Main Street

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=N, Rur=B
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Vintage
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)      37          0 *     1720     0.0000
    LEFT (L)       60         60       1720     0.0349    0.0349
------------------------------------------------------------------------
EB  THRU (T)      522        522       3440     0.1517
    LEFT (L)       96         96       1720     0.0558    0.0558
------------------------------------------------------------------------
WB  RIGHT (R)      40         40       1720     0.0233
    THRU (T)      616        616       3440     0.1791
    T + R                    656       3440     0.1907    0.1907
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.28
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION    20 O'Hara Avenue/Main Street         Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            10   90   20
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    10 ---  1.0   1.1  1.1  1.1   1.1 ---   20  RIGHT
                                                          STREET NAME:
THRU   504 ---> 1.0  (NO. OF LANES)   1.1<---  554  THRU  Main Street

RIGHT  108 ---  1.0   1.0  1.1  1.1   1.0 ---   40  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 142   40   60                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: O'Hara Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      60         60       1650     0.0364
    THRU (T)       40         40       1650     0.0242
    LEFT (L)      142        142       1650     0.0861    0.0861
    T + R                    100       1650     0.0606
------------------------------------------------------------------------
SB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)       90         90       1650     0.0545
    LEFT (L)       20         20       1650     0.0121
    T + R                    100       1650     0.0606
    T + L                    110       1650     0.0667
    T + R + L                120       1650     0.0727    0.0727
------------------------------------------------------------------------
EB  RIGHT (R)     108          0 *     1650     0.0000
    THRU (T)      504        504       1650     0.3055
    LEFT (L)       10         10       1650     0.0061    0.0061
------------------------------------------------------------------------
WB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)      554        554       1650     0.3358
    LEFT (L)       40         40       1650     0.0242
    T + R                    574       1650     0.3479    0.3479
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.51
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION    21 Empire Avenue/Cypress Road        Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0  568  144
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  2.0  1.0   1.0 ---  251  RIGHT
                                                          STREET NAME:
THRU     0 ---> 0.0  (NO. OF LANES)   0.0<---    0  THRU  Cypress Road

RIGHT    0 ---  0.0   0.0  2.1  1.1   1.0 ---  210  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0  927  120                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     120        120       1720     0.0698
    THRU (T)      927        927       3440     0.2695
    T + R                   1047       3440     0.3044    0.3044
------------------------------------------------------------------------
SB  THRU (T)      568        568       3440     0.1651
    LEFT (L)      144        144       1720     0.0837    0.0837
------------------------------------------------------------------------
WB  RIGHT (R)     251        107 *     1720     0.0622
    LEFT (L)      210        210       1720     0.1221    0.1221
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.51
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION    22 Main Street/Cypress               Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            10  510  434
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    40 ---  1.0   1.1  2.1  2.0   2.6 --- 1100  RIGHT
                                                          STREET NAME:
THRU   189 ---> 2.1  (NO. OF LANES)   1.1<---  290  THRU  Cypress

RIGHT   50 ---  1.1   1.0  2.0  1.5   1.0 ---  380  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  90  594  220                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Main Street
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     220          0 *     1650     0.0000
    THRU (T)      594        594       3300     0.1800    0.1800
    LEFT (L)       90         90       1650     0.0545
------------------------------------------------------------------------
SB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      510        510       3300     0.1545
    LEFT (L)      434        434       3000     0.1447    0.1447
    T + R                    520       3300     0.1576
------------------------------------------------------------------------
EB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)      189        189       3300     0.0573
    LEFT (L)       40         40       1650     0.0242    0.0242
    T + R                    239       3300     0.0724
------------------------------------------------------------------------
WB  RIGHT (R)    1100        861 *     3000     0.2870
    THRU (T)      290        290       1650     0.1758
    LEFT (L)      380        380       1650     0.2303
    T + R                   1151       3000     0.3837    0.3837
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.73
     INTERSECTION LEVEL OF SERVICE:                             C
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION    24 Live Oak/Laurel                   Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------           485    0  135
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   562 ---  2.0   1.0  0.0  1.0   1.1 ---  228  RIGHT
                                                          STREET NAME:
THRU  1000 ---> 3.0  (NO. OF LANES)   3.1<--- 1790  THRU  Laurel

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)     485        176 *     1720     0.1023     0.1023
    LEFT (L)      135        135       1720     0.0785
------------------------------------------------------------------------
EB  THRU (T)     1000       1000       5160     0.1938
    LEFT (L)      562        562       3127     0.1797     0.1797
------------------------------------------------------------------------
WB  RIGHT (R)     228        228       1720     0.1326
    THRU (T)     1790       1790       5160     0.3469
    T + R                   2018       5160     0.3911     0.3911
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.67
     INTERSECTION LEVEL OF SERVICE:                             B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION    25 Empire/Laurel                     Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------           460  328   51
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   260 ---  1.0   1.1  2.1  1.0   1.1 ---  261  RIGHT
                                                          STREET NAME:
THRU   725 ---> 2.1  (NO. OF LANES)   2.1<--- 1388  THRU  Laurel

RIGHT  150 ---  1.1   1.0  2.1  1.1   1.0 ---   60  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 170  556   50                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)      556        556       3300     0.1685
    LEFT (L)      170        170       1650     0.1030     0.1030
    T + R                    606       3300     0.1836
------------------------------------------------------------------------
SB  RIGHT (R)     460        460       1650     0.2788     0.2788
    THRU (T)      328        328       3300     0.0994
    LEFT (L)       51         51       1650     0.0309
    T + R                    788       3300     0.2388
------------------------------------------------------------------------
EB  RIGHT (R)     150        150       1650     0.0909
    THRU (T)      725        725       3300     0.2197
    LEFT (L)      260        260       1650     0.1576     0.1576
    T + R                    875       3300     0.2652
------------------------------------------------------------------------
WB  RIGHT (R)     261        261       1650     0.1582
    THRU (T)     1388       1388       3300     0.4206
    LEFT (L)       60         60       1650     0.0364
    T + R                   1649       3300     0.4997     0.4997
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         1.04
     INTERSECTION LEVEL OF SERVICE:                             F
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION    26 Bridgehead/Proj Dwy #1            Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0  461   39
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  1.0  1.0   1.0 ---   32  RIGHT
                                                          STREET NAME:
THRU     0 ---> 0.0  (NO. OF LANES)   0.0<---    0  THRU  Proj Dwy #1

RIGHT    0 ---  0.0   0.0  1.0  1.0   1.0 ---   62  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0  759   75                         Urb=N, Rur=B
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Bridgehead
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      75         13 *     1720     0.0076
    THRU (T)      759        759       1720     0.4413     0.4413
------------------------------------------------------------------------
SB  THRU (T)      461        461       1720     0.2680
    LEFT (L)       39         39       1720     0.0227     0.0227
------------------------------------------------------------------------
WB  RIGHT (R)      32          0 *     1720     0.0000
    LEFT (L)       62         62       1720     0.0360     0.0360
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.50
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION    27 Proj Dwy Center/Main Street       Oakley
Count Date                   Time                Peak Hour
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------            24    0   48
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    29 ---  1.0   1.0  0.0  1.0   1.0 ---   58  RIGHT
                                                          STREET NAME:
THRU  1413 ---> 3.0  (NO. OF LANES)   3.0<--- 1785  THRU  Main Street

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=N, Rur=N
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Proj Dwy Center
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)      24          0 *     1720     0.0000
    LEFT (L)       48         48       1720     0.0279     0.0279
------------------------------------------------------------------------
EB  THRU (T)     1413       1413       5160     0.2738
    LEFT (L)       29         29       1720     0.0169     0.0169
------------------------------------------------------------------------
WB  RIGHT (R)      58         10 *     1720     0.0058
    THRU (T)     1785       1785       5160     0.3459     0.3459
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.39
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION    28 Proj Dwy East/Main Street         Oakley
Count Date                   Time                Peak Hour
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------            29    0   25
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    28 ---  1.0   1.0  0.0  1.0   1.0 ---   38  RIGHT
                                                          STREET NAME:
THRU  1321 ---> 3.0  (NO. OF LANES)   3.0<--- 1995  THRU  Main Street

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=N, Rur=N
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Proj Dwy East
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)      29          1 *     1720     0.0006
    LEFT (L)       25         25       1720     0.0145     0.0145
------------------------------------------------------------------------
EB  THRU (T)     1321       1321       5160     0.2560
    LEFT (L)       28         28       1720     0.0163     0.0163
------------------------------------------------------------------------
WB  RIGHT (R)      38         13 *     1720     0.0076
    THRU (T)     1995       1995       5160     0.3866     0.3866
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.42
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION    29 Proj Dwy/Live Oak Ave             Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            11  280    6
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     9 ---  1.0   1.1  2.1  1.0   1.1 ---    4  RIGHT
                                                          STREET NAME:
THRU    20 ---> 1.1  (NO. OF LANES)   1.1<---   20  THRU  Live Oak Ave

RIGHT  168 ---  1.1   2.0  2.1  1.1   1.0 ---   50  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 214  790   60                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Proj Dwy
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      60         60       1650     0.0364
    THRU (T)      790        790       3300     0.2394
    LEFT (L)      214        214       3000     0.0713
    T + R                    850       3300     0.2576     0.2576
------------------------------------------------------------------------
SB  RIGHT (R)      11         11       1650     0.0067
    THRU (T)      280        280       3300     0.0848
    LEFT (L)        6          6       1650     0.0036     0.0036
    T + R                    291       3300     0.0882
------------------------------------------------------------------------
EB  RIGHT (R)     168        168       1650     0.1018
    THRU (T)       20         20       1650     0.0121
    LEFT (L)        9          9       1650     0.0055
    T + R                    188       1650     0.1139     0.1139
------------------------------------------------------------------------
WB  RIGHT (R)       4          4       1650     0.0024
    THRU (T)       20         20       1650     0.0121
    LEFT (L)       50         50       1650     0.0303     0.0303
    T + R                     24       1650     0.0145
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.41
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

Cumulative (2030) With Project PM
(Without Connector Ramps)

HCM Signalized Intersection Capacity Analysis
1: Wilbur Avenue & Minaker Drive

2030 PM & Proj no Ramps
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↱			↰↑	↱		↰↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	0.97		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.98	1.00
Satd. Flow (prot)	1770	3441		1770	3528			1770	1583		1817	1583
Flt Permitted	0.95	1.00		0.95	1.00			0.74	1.00		0.86	1.00
Satd. Flow (perm)	1770	3441		1770	3528			1384	1583		1604	1583
Volume (vph)	10	841	190	50	481	10	70	0	50	10	10	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	885	200	53	506	11	74	0	53	11	11	21
RTOR Reduction (vph)	0	22	0	0	2	0	0	0	46	0	0	18
Lane Group Flow (vph)	11	1063	0	53	515	0	0	74	7	0	22	3
Turn Type	Prot			Prot			Perm		Perm	Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		4
Actuated Green, G (s)	0.9	41.1		2.8	43.0			9.1	9.1		9.1	9.1
Effective Green, g (s)	0.9	41.1		2.8	43.0			9.1	9.1		9.1	9.1
Actuated g/C Ratio	0.01	0.63		0.04	0.66			0.14	0.14		0.14	0.14
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	25	2176		76	2334			194	222		225	222
v/s Ratio Prot	0.01	c0.31		c0.03	0.15							
v/s Ratio Perm								c0.05	0.00		0.01	0.00
v/c Ratio	0.44	0.49		0.70	0.22			0.38	0.03		0.10	0.01
Uniform Delay, d1	31.8	6.4		30.7	4.4			25.4	24.2		24.4	24.1
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	11.9	0.2		24.3	0.0			1.3	0.1		0.2	0.0
Delay (s)	43.7	6.5		55.0	4.4			26.6	24.2		24.6	24.1
Level of Service	D	A		D	A			C	C		C	C
Approach Delay (s)		6.9			9.1			25.6			24.3	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	9.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
2: Wilbur Avenue & Viera Avenue

2030 PM & Proj no Ramps
11/6/2006

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↱		↰	↑	↰↱	
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	831	130	43	532	50	42
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	875	137	45	560	53	44
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1012		1594	943
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1012		1594	943
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			93		52	86
cM capacity (veh/h)			685		110	318

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	1012	45	560	97
Volume Left	0	45	0	53
Volume Right	137	0	0	44
cSH	1700	685	1700	157
Volume to Capacity	0.60	0.07	0.33	0.62
Queue Length 95th (ft)	0	5	0	84
Control Delay (s)	0.0	10.6	0.0	59.3
Lane LOS		B		F
Approach Delay (s)	0.0	0.8		59.3
Approach LOS				F

Intersection Summary			
Average Delay	3.6		
Intersection Capacity Utilization	63.6%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
3: Wilbur Avenue & SR 160 SB Off

2030 PM & Proj no Ramps
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↱		↰	↑↑					↰		↱
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	694	200	110	494	0	0	0	0	293	0	100
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	731	211	116	520	0	0	0	0	308	0	105
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	520			941			1327	1587	836	1587	1693	260
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	520			941			1327	1587	836	1587	1693	260
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			84			100	100	100	0	100	86
cM capacity (veh/h)	1042			724			85	90	311	64	77	739

Direction, Lane #	EB 1	WB 1	WB 2	WB 3	SB 1	SB 2
Volume Total	941	116	260	260	308	105
Volume Left	0	116	0	0	308	0
Volume Right	211	0	0	0	0	105
cSH	1700	724	1700	1700	64	739
Volume to Capacity	0.55	0.16	0.15	0.15	4.85	0.14
Queue Length 95th (ft)	0	14	0	0	Err	12
Control Delay (s)	0.0	10.9	0.0	0.0	Err	10.7
Lane LOS		B			F	B
Approach Delay (s)	0.0	2.0			7457.4	
Approach LOS					F	

Intersection Summary			
Average Delay	1550.5		
Intersection Capacity Utilization	81.0%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
4: Wilbur Avenue & SR 160 NB On

2030 PM & Proj no Ramps
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑			↑↑↱		↰		↱			
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	350	637	0	0	554	222	50	0	80	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	368	671	0	0	583	234	53	0	84	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	817			671			1699	2224	335	1772	2107	408
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	817			671			1699	2224	335	1772	2107	408
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	54			100			0	100	87	100	100	100
cM capacity (veh/h)	807			916			38	23	661	29	28	592

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2
Volume Total	368	335	335	389	428	53	84
Volume Left	368	0	0	0	0	53	0
Volume Right	0	0	0	0	234	0	84
cSH	807	1700	1700	1700	1700	38	661
Volume to Capacity	0.46	0.20	0.20	0.23	0.25	1.37	0.13
Queue Length 95th (ft)	60	0	0	0	0	136	11
Control Delay (s)	13.2	0.0	0.0	0.0	0.0	437.4	11.2
Lane LOS	B					F	B
Approach Delay (s)	4.7			0.0		175.1	
Approach LOS						F	

Intersection Summary			
Average Delay	14.5		
Intersection Capacity Utilization	81.0%	ICU Level of Service	D
Analysis Period (min)	15		

5: Wilbur Avenue & Bridgehead Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	30	364	324	50	402	10	325	50	80	10	30	50
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	383	341	53	423	11	342	53	84	11	32	53

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1
Volume Total (vph)	32	724	486	479	95
Volume Left (vph)	32	0	53	342	11
Volume Right (vph)	0	341	11	84	53
Hadj (s)	0.53	-0.30	0.04	0.07	-0.28
Departure Headway (s)	8.6	7.8	7.7	7.7	9.3
Degree Utilization, x	0.08	1.57	1.04	1.02	0.24
Capacity (veh/h)	408	466	471	479	384
Control Delay (s)	11.1	285.3	82.0	74.6	15.2
Approach Delay (s)	273.8		82.0	74.6	15.2
Approach LOS	F		F	F	C

Intersection Summary			
Delay	156.4		
HCM Level of Service	F		
Intersection Capacity Utilization	102.6%	ICU Level of Service	G
Analysis Period (min)	15		

6: E 18th Street & Hillcrest Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↱		↰	↑	↱	↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3438		1770	3505		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3438		1770	3505		1770	1863	1583	1770	1863	1583
Volume (vph)	70	1021	240	321	581	40	190	210	301	80	140	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	1075	253	338	612	42	200	221	317	84	147	63
RTOR Reduction (vph)	0	18	0	0	4	0	0	0	144	0	0	54
Lane Group Flow (vph)	74	1310	0	338	650	0	200	221	173	84	147	9
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases									8			4
Actuated Green, G (s)	6.9	41.4		20.9	55.4		12.0	20.9	20.9	5.5	14.4	14.4
Effective Green, g (s)	7.9	43.4		21.9	57.4		13.0	22.4	22.4	6.5	15.9	15.9
Actuated g/C Ratio	0.07	0.41		0.21	0.54		0.12	0.21	0.21	0.06	0.15	0.15
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	132	1405		365	1894		217	393	334	108	279	237
v/s Ratio Prot	0.04	c0.38		c0.19	0.19		c0.11	c0.12		0.05	0.08	
v/s Ratio Perm									0.11			0.01
v/c Ratio	0.56	0.93		0.93	0.34		0.92	0.56	0.52	0.78	0.53	0.04
Uniform Delay, d1	47.5	30.0		41.4	13.8		46.1	37.5	37.1	49.1	41.7	38.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.4	11.4		28.8	0.1		39.9	1.8	1.4	28.9	1.8	0.1
Delay (s)	52.8	41.4		70.2	13.9		86.0	39.4	38.5	78.0	43.5	38.7
Level of Service	D	D		E	B		F	D	D	E	D	D
Approach Delay (s)		42.0			33.1			51.6			52.3	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM Average Control Delay	42.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	106.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	84.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

7: E 18th Street & Viera Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑↱			↰↑	↱		✥	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	0.98			1.00	0.85		0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00		0.99	
Satd. Flow (prot)	1770	3539	1583	1770	3481			1788	1583		1719	
Flt Permitted	0.27	1.00	1.00	0.18	1.00			0.57	1.00		0.89	
Satd. Flow (perm)	498	3539	1583	343	3481			1060	1583		1544	
Volume (vph)	120	1080	190	30	760	93	100	20	20	82	80	150
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	126	1137	200	32	800	98	105	21	21	86	84	158
RTOR Reduction (vph)	0	0	86	0	15	0	0	0	15	0	60	0
Lane Group Flow (vph)	126	1137	114	32	883	0	0	126	6	0	268	0
Turn Type	Perm		Perm	Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	25.2	25.2	25.2	25.2	25.2			12.4	12.4		12.4	
Effective Green, g (s)	27.2	27.2	27.2	27.2	27.2			14.4	14.4		14.4	
Actuated g/C Ratio	0.57	0.57	0.57	0.57	0.57			0.30	0.30		0.30	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	285	2022	905	196	1989			321	479		467	
v/s Ratio Prot		c0.32			0.25							
v/s Ratio Perm	0.25		0.07	0.09				0.12	0.00		c0.17	
v/c Ratio	0.44	0.56	0.13	0.16	0.44			0.39	0.01		0.57	
Uniform Delay, d1	5.8	6.4	4.7	4.8	5.9			13.1	11.6		14.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	1.1	0.4	0.1	0.4	0.2			0.8	0.0		1.7	
Delay (s)	6.9	6.8	4.8	5.2	6.0			13.9	11.6		15.7	
Level of Service	A	A	A	A	A			B	B		B	
Approach Delay (s)		6.5			6.0			13.6			15.7	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	7.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	47.6	Sum of lost time (s)	6.0
Intersection Capacity Utilization	67.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

8: E 18th Street & Phillips Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑	↱	↰	↑↱		↰↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.97	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.88		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3528		1770	3539	1583	1770	1631		3433	1592	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3528		1770	3539	1583	1770	1631		3433	1592	
Volume (vph)	280	933	20	20	614	230	20	10	50	250	10	310
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	295	982	21	21	646	242	21	11	53	263	11	326
RTOR Reduction (vph)	0	2	0	0	0	173	0	48	0	0	274	0
Lane Group Flow (vph)	295	1001	0	21	646	69	21	16	0	263	63	0
Turn Type	Prot			Prot		Perm	Split			Split		
Protected Phases	5	2		1	6		7	7		3	3	
Permitted Phases						6						
Actuated Green, G (s)	15.2	33.3		1.4	19.5	19.5	6.7	6.7		10.9	10.9	
Effective Green, g (s)	15.2	33.3		1.4	19.5	19.5	6.7	6.7		10.9	10.9	
Actuated g/C Ratio	0.22	0.49		0.02	0.29	0.29	0.10	0.10		0.16	0.16	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	394	1720		36	1010	452	174	160		548	254	
v/s Ratio Prot	c0.17	c0.28		0.01	0.18		c0.01	0.01		c0.08	0.04	
v/s Ratio Perm						0.04						
v/c Ratio	0.75	0.58		0.58	0.64	0.15	0.12	0.10		0.48	0.25	
Uniform Delay, d1	24.8	12.5		33.2	21.3	18.2	28.1	28.1		26.1	25.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.6	0.5		21.8	1.3	0.2	0.3	0.3		0.7	0.5	
Delay (s)	32.4	13.0		55.0	22.7	18.4	28.4	28.3		26.8	25.6	
Level of Service	C	B		D	C	B	C	C		C	C	
Approach Delay (s)		17.4			22.3			28.4			26.1	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM Average Control Delay	21.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	68.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

9: E 18th Street & SR 160 SB Off

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↳		↰↰	↑↑	↱		↲	↱	↰	↳	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		0.97	0.95	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85		1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1719	3378		3335	3438	1538		1747	1538	1719	1702	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.75	1.00	0.66	1.00	
Satd. Flow (perm)	1719	3378		3335	3438	1538		1364	1538	1191	1702	
Volume (vph)	30	1053	140	1032	754	100	50	20	228	90	30	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	1108	147	1086	794	105	53	21	240	95	32	21
RTOR Reduction (vph)	0	7	0	0	0	24	0	0	0	0	19	0
Lane Group Flow (vph)	32	1248	0	1086	794	81	0	74	240	95	34	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot		Perm	Perm		Free	Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases						6	8		Free	4		
Actuated Green, G (s)	3.6	58.6		44.6	99.6	99.6		13.8	130.0	13.8	13.8	
Effective Green, g (s)	3.6	59.6		44.6	100.6	100.6		13.8	130.0	13.8	13.8	
Actuated g/C Ratio	0.03	0.46		0.34	0.77	0.77		0.11	1.00	0.11	0.11	
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0		4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	4.0	4.0		2.0		2.0	2.0	
Lane Grp Cap (vph)	48	1549		1144	2660	1190		145	1538	126	181	
v/s Ratio Prot	0.02	c0.37		c0.33	0.23						0.02	
v/s Ratio Perm						0.05		0.05	0.16	c0.08		
v/c Ratio	0.67	0.81		0.95	0.30	0.07		0.51	0.16	0.75	0.19	
Uniform Delay, d1	62.6	30.2		41.6	4.3	3.5		54.9	0.0	56.5	53.0	
Progression Factor	1.00	1.00		0.67	0.85	1.28		1.00	1.00	1.00	1.00	
Incremental Delay, d2	29.8	4.6		14.5	0.3	0.1		1.3	0.2	20.0	0.2	
Delay (s)	92.4	34.8		42.2	3.9	4.6		56.2	0.2	76.5	53.2	
Level of Service	F	C		D	A	A		E	A	E	D	
Approach Delay (s)		36.2			24.9			13.4			68.1	
Approach LOS		D			C			B			E	

Intersection Summary			
HCM Average Control Delay	29.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

10: Main Street & SR 160 NB On

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↳		↰	↑↑↑	↰	↱↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		1.00	0.91	1.00	0.88
Frt	0.98		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	4854		1719	4940	1719	2707
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	4854		1719	4940	1719	2707
Volume (vph)	1211	160	270	1716	170	1600
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1275	168	284	1806	179	1684
RTOR Reduction (vph)	13	0	0	0	0	2
Lane Group Flow (vph)	1430	0	284	1806	179	1682
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Turn Type			Prot			pm+ov
Protected Phases	2		1	6	8	1
Permitted Phases						8
Actuated Green, G (s)	39.0		64.0	107.0	14.0	78.0
Effective Green, g (s)	40.0		64.0	108.0	14.0	78.0
Actuated g/C Ratio	0.31		0.49	0.83	0.11	0.60
Clearance Time (s)	5.0		4.0	5.0	4.0	4.0
Vehicle Extension (s)	4.0		3.0	4.0	2.0	3.0
Lane Grp Cap (vph)	1494		846	4104	185	1707
v/s Ratio Prot	c0.29		0.17	0.37	0.10	c0.48
v/s Ratio Perm						0.14
v/c Ratio	0.96		0.34	0.44	0.97	0.99
Uniform Delay, d1	44.2		20.1	2.9	57.8	25.4
Progression Factor	0.49		0.94	0.11	1.00	1.00
Incremental Delay, d2	12.3		0.2	0.3	55.8	18.2
Delay (s)	34.1		19.1	0.6	113.6	43.6
Level of Service	C		B	A	F	D
Approach Delay (s)	34.1			3.1	50.3	
Approach LOS	C			A	D	

Intersection Summary			
HCM Average Control Delay	27.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	89.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

11: Main Street & Bridgehead Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↳		↰	↑↑↑	↱	↰↰	↳		↰↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00	0.97	1.00		0.97	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	4820		1719	4940	1538	3335	1740		3335	1810	1538
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1719	4820		1719	4940	1538	3335	1740		3335	1810	1538
Volume (vph)	164	2217	430	120	1497	194	260	290	100	253	181	228
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	173	2334	453	126	1576	204	274	305	105	266	191	240
RTOR Reduction (vph)	0	22	0	0	0	111	0	10	0	0	0	218
Lane Group Flow (vph)	173	2765	0	126	1576	93	274	400	0	266	191	22
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot		Perm	Split			Split		Perm
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases						6						7
Actuated Green, G (s)	16.6	67.0		8.0	58.4	58.4	26.0	26.0		12.0	12.0	12.0
Effective Green, g (s)	16.6	68.0		8.0	59.4	59.4	26.0	26.0		12.0	12.0	12.0
Actuated g/C Ratio	0.13	0.52		0.06	0.46	0.46	0.20	0.20		0.09	0.09	0.09
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	220	2521		106	2257	703	667	348		308	167	142
v/s Ratio Prot	0.10	c0.57		c0.07	0.32		0.08	c0.23		0.08	c0.11	
v/s Ratio Perm						0.06						0.01
v/c Ratio	0.79	1.10		1.19	0.70	0.13	0.41	1.15		0.86	1.14	0.16
Uniform Delay, d1	55.0	31.0		61.0	28.2	20.4	45.3	52.0		58.2	59.0	54.3
Progression Factor	1.02	0.89		0.58	0.24	0.03	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.8	45.7		137.4	1.5	0.3	0.2	95.7		20.7	113.5	0.2
Delay (s)	60.8	73.3		172.9	8.3	1.0	45.5	147.7		78.9	172.5	54.5
Level of Service	E	E		F	A	A	D	F		E	F	D
Approach Delay (s)		72.5			18.4			106.8			96.2	
Approach LOS		E			B			F			F	

Intersection Summary			
HCM Average Control Delay	62.4	HCM Level of Service	E
HCM Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	103.8%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

12: Main Street & Sandy Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↳		↰	↑↑↳		↰	↑	↱	↰	↳	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	4875		1719	4890		1719	1863	1538	1770	1597	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	4875		1719	4890		1719	1863	1538	1770	1597	
Volume (vph)	160	2200	210	40	1576	144	110	7	160	194	7	125
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	168	2316	221	42	1659	152	116	7	168	204	7	132
RTOR Reduction (vph)	0	7	0	0	7	0	0	0	150	0	121	0
Lane Group Flow (vph)	168	2530	0	42	1804	0	116	7	18	204	18	0
Heavy Vehicles (%)	2%	5%	5%	5%	5%	2%	5%	2%	5%	2%	2%	2%
Turn Type	Prot			Prot			Prot		custom	Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									3			
Actuated Green, G (s)	16.8	81.1		7.1	70.9		13.8	2.7	13.8	22.6	11.0	
Effective Green, g (s)	16.8	81.6		7.1	71.9		14.3	2.7	14.3	22.6	11.0	
Actuated g/C Ratio	0.13	0.63		0.05	0.55		0.11	0.02	0.11	0.17	0.08	
Clearance Time (s)	4.0	4.5		4.0	5.0		4.5	4.0	4.5	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	229	3060		94	2705		189	39	169	308	135	
v/s Ratio Prot	0.09	c0.52		0.02	c0.37		0.07	0.00		c0.12	c0.01	
v/s Ratio Perm									0.01			
v/c Ratio	0.73	0.83		0.45	0.67		0.61	0.18	0.11	0.66	0.13	
Uniform Delay, d1	54.4	18.7		59.5	20.6		55.2	62.6	52.1	50.1	55.1	
Progression Factor	0.58	0.10		1.29	0.42		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.1	0.3		3.1	1.2		5.8	2.2	0.3	5.3	0.5	
Delay (s)	32.6	2.0		79.7	9.8		61.0	64.8	52.4	55.4	55.5	
Level of Service	C	A		E	A		E	E	D	E	E	
Approach Delay (s)		3.9			11.4			56.1			55.5	
Approach LOS		A			B			E			E	

Intersection Summary			
HCM Average Control Delay	12.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
13: Main Street & Live Oak Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑	↱	↰	↑↑↱		↰	↑↱		↰↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91		1.00	0.95		0.97	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	4940	1538	1719	4810		1719	3338		3433	3421	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	4940	1538	1719	4810		1719	3338		3433	3421	
Volume (vph)	292	2054	271	137	1417	389	218	453	214	458	641	184
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	307	2162	285	144	1492	409	229	477	225	482	675	194
RTOR Reduction (vph)	0	0	110	0	38	0	0	43	0	0	20	0
Lane Group Flow (vph)	307	2162	175	144	1863	0	229	659	0	482	849	0
Heavy Vehicles (%)	2%	5%	5%	5%	5%	2%	5%	2%	5%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2									
Actuated Green, G (s)	21.0	58.0	58.0	11.0	48.0		16.0	26.0		19.0	29.0	
Effective Green, g (s)	21.0	58.0	58.0	11.0	48.0		16.0	26.0		19.0	29.0	
Actuated g/C Ratio	0.16	0.45	0.45	0.08	0.37		0.12	0.20		0.15	0.22	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	286	2204	686	145	1776		212	668		502	763	
v/s Ratio Prot	0.17	c0.44		0.08	c0.39		0.13	c0.20		0.14	c0.25	
v/s Ratio Perm			0.11									
v/c Ratio	1.07	0.98	0.26	0.99	1.05		1.08	0.99		0.96	1.11	
Uniform Delay, d1	54.5	35.5	22.5	59.5	41.0		57.0	51.8		55.1	50.5	
Progression Factor	0.67	0.49	0.08	1.02	0.47		1.00	1.00		1.00	1.00	
Incremental Delay, d2	67.6	12.9	0.7	67.2	34.2		84.8	31.1		30.2	68.0	
Delay (s)	103.9	30.2	2.4	127.9	53.5		141.8	82.9		85.3	118.5	
Level of Service	F	C	A	F	D		F	F		F	F	
Approach Delay (s)		35.5			58.7			97.4			106.6	
Approach LOS		D			E			F			F	

Intersection Summary			
HCM Average Control Delay	63.9	HCM Level of Service	E
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	101.2%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
14: Main Street & Big Break Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↱			↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.91			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.97	1.00
Satd. Flow (prot)	1770	3438	1583	1770	3438	1583	1770	1695			1800	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.50	1.00			0.47	1.00
Satd. Flow (perm)	1770	3438	1583	1770	3438	1583	931	1695			871	1583
Volume (vph)	297	2254	180	90	1576	80	120	60	90	90	40	251
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	313	2373	189	95	1659	84	126	63	95	95	42	264
RTOR Reduction (vph)	0	0	38	0	0	22	0	41	0	0	0	223
Lane Group Flow (vph)	313	2373	151	95	1659	62	126	117	0	0	137	41
Heavy Vehicles (%)	2%	5%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot		custom	Prot		custom	Perm			Perm		Perm
Protected Phases	5			1				3			7	
Permitted Phases		2	2		6	6	3			7		7
Actuated Green, G (s)	27.0	90.0	90.0	7.0	69.0	69.0	20.0	20.0			20.0	20.0
Effective Green, g (s)	28.0	91.0	91.0	7.0	70.0	70.0	20.0	20.0			20.0	20.0
Actuated g/C Ratio	0.22	0.70	0.70	0.05	0.54	0.54	0.15	0.15			0.15	0.15
Clearance Time (s)	5.0	5.0	5.0	4.0	5.0	5.0	4.0	4.0			4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	381	2407	1108	95	1851	852	143	261			134	244
v/s Ratio Prot	0.18			0.05				0.07				
v/s Ratio Perm		c0.69	0.10		c0.48	0.04	0.14				c0.16	0.03
v/c Ratio	0.82	0.99	0.14	1.00	0.90	0.07	0.88	0.45			1.02	0.17
Uniform Delay, d1	48.6	18.9	6.5	61.5	26.8	14.4	53.8	50.0			55.0	47.8
Progression Factor	0.72	0.30	0.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	10.1	13.1	0.2	92.3	7.3	0.2	42.2	1.2			83.8	0.3
Delay (s)	44.8	18.8	0.2	153.8	34.0	14.6	96.0	51.2			138.8	48.1
Level of Service	D	B	A	F	C	B	F	D			F	D
Approach Delay (s)		20.4			39.3			71.1			79.1	
Approach LOS		C			D			E			E	

Intersection Summary			
HCM Average Control Delay	33.9	HCM Level of Service	C
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	96.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
15: Oakley Road & Neroly Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	30	174	140	20	104	107	60	364	20	177	464	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	183	147	21	109	113	63	383	21	186	488	21

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	362	243	467	696
Volume Left (vph)	32	21	63	186
Volume Right (vph)	147	113	21	21
Hadj (s)	-0.19	-0.23	0.03	0.07
Departure Headway (s)	8.3	8.9	8.2	8.2
Degree Utilization, x	0.84	0.60	1.07	1.59
Capacity (veh/h)	425	384	446	441
Control Delay (s)	42.0	24.6	90.3	298.5
Approach Delay (s)	42.0	24.6	90.3	298.5
Approach LOS	E	C	F	F

Intersection Summary			
Delay	153.3		
HCM Level of Service	F		
Intersection Capacity Utilization	94.6%	ICU Level of Service	F
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
16: Oakley Road & Live Oak Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	47	290	30	60	210	249	50	549	60	310	661	38
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	49	305	32	63	221	262	53	578	63	326	696	40

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	386	546	694	1062
Volume Left (vph)	49	63	53	326
Volume Right (vph)	32	262	63	40
Hadj (s)	0.01	-0.23	-0.01	0.07
Departure Headway (s)	9.6	9.3	9.6	9.6
Degree Utilization, x	1.03	1.42	1.84	2.84
Capacity (veh/h)	386	396	382	384
Control Delay (s)	85.6	227.4	411.3	856.7
Approach Delay (s)	85.6	227.4	411.3	856.7
Approach LOS	F	F	F	F

Intersection Summary			
Delay	503.1		
HCM Level of Service	F		
Intersection Capacity Utilization	137.9%	ICU Level of Service	H
Analysis Period (min)	15		

17: Oakley Road & Empire Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↑	↱		↰↑	↱	↰	↑ ↑↱		↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95		1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1716	1583		1807	1583	1770	3518		1770	1863	1583
Flt Permitted	0.95	0.97	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1681	1716	1583		1807	1583	1770	3518		1770	1863	1583
Volume (vph)	250	60	380	80	50	80	389	720	30	150	688	150
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	263	63	400	84	53	84	409	758	32	158	724	158
RTOR Reduction (vph)	0	0	359	0	0	74	0	2	0	0	0	65
Lane Group Flow (vph)	159	167	41	0	137	10	409	788	0	158	724	93
Turn Type	Split		Perm	Split		Perm	Prot			Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8						6
Actuated Green, G (s)	13.0	13.0	13.0		14.4	14.4	29.0	63.5		15.6	50.1	50.1
Effective Green, g (s)	13.0	13.0	13.0		15.4	15.4	30.0	64.5		16.6	51.1	51.1
Actuated g/C Ratio	0.10	0.10	0.10		0.12	0.12	0.24	0.51		0.13	0.41	0.41
Clearance Time (s)	4.0	4.0	4.0		5.0	5.0	5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	174	178	164		222	194	423	1808		234	759	645
v/s Ratio Prot	0.09	c0.10			c0.08		c0.23	0.22		0.09	c0.39	
v/s Ratio Perm			0.03			0.01						0.06
v/c Ratio	0.91	0.94	0.25		0.62	0.05	0.97	0.44		0.68	0.95	0.14
Uniform Delay, d1	55.7	55.9	51.8		52.3	48.6	47.3	19.1		51.9	36.1	23.4
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	44.0	49.2	0.8		5.0	0.1	34.8	0.2		7.5	21.9	0.1
Delay (s)	99.7	105.1	52.6		57.3	48.7	82.1	19.3		59.4	58.0	23.5
Level of Service	F	F	D		E	D	F	B		E	E	C
Approach Delay (s)		75.0			54.0			40.7			53.0	
Approach LOS		E			D			D			D	

Intersection Summary

HCM Average Control Delay	53.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	125.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	82.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

18: Main Street & Empire Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑ ↑	↱	↰	↑ ↑↱		↰ ↰	↑	↱		↰↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.97	1.00
Satd. Flow (prot)	1719	3539	1538	1770	3530		3335	1810	1583		1787	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.97	1.00
Satd. Flow (perm)	1719	3539	1538	1770	3530		3335	1810	1583		1787	1538
Volume (vph)	40	1859	578	390	1173	20	590	40	420	30	20	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	1957	608	411	1235	21	621	42	442	32	21	32
RTOR Reduction (vph)	0	0	179	0	1	0	0	0	217	0	0	31
Lane Group Flow (vph)	42	1957	429	411	1255	0	621	42	225	0	53	1
Heavy Vehicles (%)	5%	2%	5%	2%	2%	2%	5%	5%	2%	2%	5%	5%
Turn Type	Prot		Perm	Prot			Split		Perm	Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	5.6	61.0	61.0	24.0	79.4		23.0	23.0	23.0		4.0	4.0
Effective Green, g (s)	6.6	62.0	62.0	25.0	80.4		24.0	24.0	24.0		4.0	4.0
Actuated g/C Ratio	0.05	0.47	0.47	0.19	0.61		0.18	0.18	0.18		0.03	0.03
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	87	1675	728	338	2167		611	332	290		55	47
v/s Ratio Prot	0.02	c0.55		c0.23	0.36		c0.19	0.02			c0.03	
v/s Ratio Perm			0.28						0.14			0.00
v/c Ratio	0.48	1.17	0.59	1.22	0.58		1.02	0.13	0.77		0.96	0.02
Uniform Delay, d1	60.5	34.5	25.2	53.0	15.2		53.5	44.7	50.9		63.4	61.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	4.2	82.6	1.2	121.2	0.4		40.6	0.2	12.2		107.4	0.2
Delay (s)	64.7	117.1	26.4	174.2	15.5		94.1	44.9	63.1		170.8	61.8
Level of Service	E	F	C	F	B		F	D	E		F	E
Approach Delay (s)		95.1			54.7			79.8			129.8	
Approach LOS		F			D			E			F	

Intersection Summary

HCM Average Control Delay	80.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	131.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	106.5%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

19: Main Street & Vintage Parkway

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑ ↑	↑ ↑↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3513		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3539	3513		1770	1583
Volume (vph)	55	1124	969	50	90	55
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	58	1183	1020	53	95	58
RTOR Reduction (vph)	0	0	3	0	0	50
Lane Group Flow (vph)	58	1183	1070	0	95	8
Turn Type	Prot					Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	4.5	48.6	40.1		8.8	8.8
Effective Green, g (s)	4.5	49.6	41.1		8.8	8.8
Actuated g/C Ratio	0.07	0.75	0.62		0.13	0.13
Clearance Time (s)	4.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	120	2644	2174		235	210
v/s Ratio Prot	0.03	c0.33	c0.30		c0.05	
v/s Ratio Perm						0.00
v/c Ratio	0.48	0.45	0.49		0.40	0.04
Uniform Delay, d1	29.8	3.2	6.9		26.4	25.1
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.0	0.1	0.2		1.1	0.1
Delay (s)	32.9	3.3	7.1		27.5	25.2
Level of Service	C	A	A		C	C
Approach Delay (s)		4.7	7.1		26.6	
Approach LOS		A	A		C	

Intersection Summary

HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	66.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	46.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

20: Main Street & O'Hara Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑↱		↰	↑↱			↰↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.94			0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1770	1863	1583	1770	1856		1770	1751			1796	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.71	1.00			0.87	
Satd. Flow (perm)	1770	1863	1583	1770	1856		1329	1751			1601	
Volume (vph)	20	1023	201	60	853	20	205	60	40	30	40	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	1077	212	63	898	21	216	63	42	32	42	11
RTOR Reduction (vph)	0	0	79	0	1	0	0	28	0	0	6	0
Lane Group Flow (vph)	21	1077	133	63	918	0	216	77	0	0	79	0
Turn Type	Prot		Perm	Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4				2			6		
Actuated Green, G (s)	1.5	54.5	54.5	3.1	56.1		17.1	17.1			18.1	
Effective Green, g (s)	1.5	55.5	55.5	3.1	57.1		18.1	18.1			18.1	
Actuated g/C Ratio	0.02	0.63	0.63	0.03	0.64		0.20	0.20			0.20	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	30	1166	990	62	1195		271	357			327	
v/s Ratio Prot	0.01	c0.58		c0.04	0.49			0.04				
v/s Ratio Perm			0.08				c0.16				0.05	
v/c Ratio	0.70	0.92	0.13	1.02	0.77		0.80	0.22			0.24	
Uniform Delay, d1	43.4	14.7	6.8	42.8	11.1		33.6	29.4			29.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	52.7	12.1	0.1	118.9	3.0		14.9	0.3			0.4	
Delay (s)	96.1	26.8	6.8	161.7	14.2		48.5	29.7			29.9	
Level of Service	F	C	A	F	B		D	C			C	
Approach Delay (s)		24.7			23.6			42.3			29.9	
Approach LOS		C			C			D			C	

Intersection Summary

HCM Average Control Delay	26.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	88.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
21: Cypress Road & Empire Avenue

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↱		↰	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.97		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3434		1770	3539
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1583	3434		1770	3539
Volume (vph)	150	323	887	220	321	877
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	158	340	934	232	338	923
RTOR Reduction (vph)	0	280	23	0	0	0
Lane Group Flow (vph)	158	60	1143	0	338	923
Turn Type		Perm			Prot	
Protected Phases	8		2		1	6
Permitted Phases		8				
Actuated Green, G (s)	11.9	11.9	29.2		17.7	50.9
Effective Green, g (s)	12.9	12.9	30.2		17.7	51.9
Actuated g/C Ratio	0.18	0.18	0.41		0.24	0.71
Clearance Time (s)	5.0	5.0	5.0		4.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	314	281	1425		430	2523
v/s Ratio Prot	c0.09		c0.33		c0.19	0.26
v/s Ratio Perm		0.04				
v/c Ratio	0.50	0.21	0.80		0.79	0.37
Uniform Delay, d1	27.1	25.6	18.7		25.8	4.1
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.3	0.4	3.3		9.2	0.1
Delay (s)	28.3	26.0	22.0		34.9	4.1
Level of Service	C	C	C		C	A
Approach Delay (s)	26.7		22.0			12.4
Approach LOS	C		C			B

Intersection Summary			
HCM Average Control Delay	18.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	72.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
22: Cypress Road & Main Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↱	↱	↰	↑↑	↱	↰↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	0.95	1.00	0.95	1.00	0.97	0.95	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3460		1770	1770	1504	1770	3539	1583	3433	3529	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3460		1770	1770	1504	1770	3539	1583	3433	3529	
Volume (vph)	100	402	70	280	400	832	130	552	410	1080	1033	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	423	74	295	421	876	137	581	432	1137	1087	21
RTOR Reduction (vph)	0	12	0	0	0	21	0	0	9	0	1	0
Lane Group Flow (vph)	105	485	0	295	421	855	137	581	423	1137	1107	0
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		
Protected Phases	7	4		3	8	1	5	2	3	1	6	
Permitted Phases						8			2			
Actuated Green, G (s)	8.0	17.0		21.0	30.0	71.0	12.2	25.0	46.0	41.0	53.8	
Effective Green, g (s)	8.0	17.0		21.0	30.0	71.0	12.2	25.0	46.0	41.0	53.8	
Actuated g/C Ratio	0.07	0.14		0.18	0.25	0.59	0.10	0.21	0.38	0.34	0.45	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	118	490		310	443	940	180	737	660	1173	1582	
v/s Ratio Prot	0.06	0.14		c0.17	0.24	c0.31	0.08	c0.16	0.11	c0.33	0.31	
v/s Ratio Perm						0.26			0.16			
v/c Ratio	0.89	0.99		0.95	0.95	0.91	0.76	0.79	0.64	0.97	0.70	
Uniform Delay, d1	55.6	51.4		49.0	44.3	21.7	52.5	45.0	30.3	38.9	26.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	49.7	37.6		38.2	30.3	12.4	17.1	8.4	2.1	19.1	2.6	
Delay (s)	105.3	89.0		87.2	74.6	34.0	69.6	53.4	32.4	57.9	29.2	
Level of Service	F	F		F	E	C	E	D	C	E	C	
Approach Delay (s)		91.8			54.6			47.4			43.8	
Approach LOS		F			D			D			D	

Intersection Summary			
HCM Average Control Delay	52.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	102.9%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
23: Neroly Road & Live Oak Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↑↱			↰↑↑↱			↰↑↱			↰↑↱	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	20	387	254	150	387	399	114	274	60	361	275	30
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	407	267	158	407	420	120	288	63	380	289	32

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	225	471	362	624	472	701
Volume Left (vph)	21	0	158	0	120	380
Volume Right (vph)	0	267	0	420	63	32
Hadj (s)	0.08	-0.36	0.25	-0.44	0.00	0.12
Departure Headway (s)	9.7	9.3	9.9	9.2	9.5	9.6
Degree Utilization, x	0.61	1.21	0.99	1.59	1.24	1.86
Capacity (veh/h)	362	394	362	395	386	381
Control Delay (s)	25.4	144.6	76.4	300.5	156.8	421.0
Approach Delay (s)	106.1		218.3		156.8	421.0
Approach LOS	F		F		F	F

Intersection Summary			
Delay	230.6		
HCM Level of Service	F		
Intersection Capacity Utilization	121.3%	ICU Level of Service	H
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
24: Laurel Road & Live Oak Avenue

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰↰	↑↑↑	↑↑↑↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	0.91	0.91		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3433	5085	4993		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	3433	5085	4993		1770	1583
Volume (vph)	740	1950	1430	197	397	382
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	779	2053	1505	207	418	402
RTOR Reduction (vph)	0	0	22	0	0	299
Lane Group Flow (vph)	779	2053	1690	0	418	103
Turn Type	Prot					Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	19.0	51.0	28.0		20.3	20.3
Effective Green, g (s)	19.0	51.0	28.0		20.3	20.3
Actuated g/C Ratio	0.24	0.64	0.35		0.26	0.26
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	823	3270	1763		453	405
v/s Ratio Prot	c0.23	0.40	c0.34		c0.24	
v/s Ratio Perm						0.06
v/c Ratio	0.95	0.63	0.96		0.92	0.25
Uniform Delay, d1	29.7	8.5	25.1		28.7	23.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	19.4	0.4	12.9		24.3	0.3
Delay (s)	49.0	8.9	37.9		53.1	23.8
Level of Service	D	A	D		D	C
Approach Delay (s)		19.9	37.9		38.7	
Approach LOS		B	D		D	

Intersection Summary			
HCM Average Control Delay	28.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	79.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

25: Laurel Road & Empire Avenue

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.98		1.00	0.97		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3449		1770	3485		1770	3444		1770	3300	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3449		1770	3485		1770	3444		1770	3300	
Volume (vph)	550	1517	310	110	1067	122	160	545	120	182	486	400
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	579	1597	326	116	1123	128	168	574	126	192	512	421
RTOR Reduction (vph)	0	13	0	0	7	0	0	14	0	0	114	0
Lane Group Flow (vph)	579	1910	0	116	1244	0	168	686	0	192	819	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	35.0	66.0		8.0	39.0		11.0	27.0		13.0	29.0	
Effective Green, g (s)	35.0	66.0		8.0	39.0		11.0	27.0		13.0	29.0	
Actuated g/C Ratio	0.27	0.51		0.06	0.30		0.08	0.21		0.10	0.22	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	477	1751		109	1046		150	715		177	736	
v/s Ratio Prot	c0.33	0.55		0.07	c0.36		0.09	0.20		c0.11	c0.25	
v/s Ratio Perm												
v/c Ratio	1.21	1.09		1.06	1.19		1.12	0.96		1.08	1.11	
Uniform Delay, d1	47.5	32.0		61.0	45.5		59.5	51.0		58.5	50.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	114.3	50.7		104.5	94.9		109.3	23.7		92.1	68.5	
Delay (s)	161.8	82.7		165.5	140.4		168.8	74.7		150.6	119.0	
Level of Service	F	F		F	F		F	E		F	F	
Approach Delay (s)		101.0			142.5			92.9			124.4	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	114.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	112.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

26: Proj Dwy & Bridgehead Road

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑	↱	↰	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1583	1863	1583	1770	1863
Volume (vph)	159	81	494	154	80	503
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	167	85	520	162	84	529
RTOR Reduction (vph)	0	70	0	76	0	0
Lane Group Flow (vph)	167	15	520	86	84	529
Turn Type		Perm		Perm	Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	9.5	9.5	28.6	28.6	3.8	36.9
Effective Green, g (s)	10.0	10.0	29.6	29.6	4.3	37.9
Actuated g/C Ratio	0.18	0.18	0.53	0.53	0.08	0.68
Clearance Time (s)	4.5	4.5	5.0	5.0	4.5	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	317	283	986	838	136	1263
v/s Ratio Prot	c0.09		c0.28		c0.05	0.28
v/s Ratio Perm		0.01		0.05		
v/c Ratio	0.53	0.05	0.53	0.10	0.62	0.42
Uniform Delay, d1	20.8	19.0	8.6	6.5	25.0	4.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.6	0.1	0.5	0.1	8.1	0.2
Delay (s)	22.4	19.1	9.1	6.6	33.1	4.3
Level of Service	C	B	A	A	C	A
Approach Delay (s)	21.3		8.5			8.2
Approach LOS	C		A			A

Intersection Summary			
HCM Average Control Delay	10.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	55.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

27: Main Street & Proj Dwy Center

	↗	→	←	↖	↘	↙
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑↑	↑↑↑	↱	↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	1770	1583
Flt Permitted	0.11	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	209	5085	5085	1583	1770	1583
Volume (vph)	126	2429	1667	152	189	93
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	133	2557	1755	160	199	98
RTOR Reduction (vph)	0	0	0	30	0	52
Lane Group Flow (vph)	133	2557	1755	130	199	46
Turn Type	Perm			Perm		Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Actuated Green, G (s)	105.5	105.5	105.5	105.5	16.5	16.5
Effective Green, g (s)	105.5	105.5	105.5	105.5	16.5	16.5
Actuated g/C Ratio	0.81	0.81	0.81	0.81	0.13	0.13
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	170	4127	4127	1285	225	201
v/s Ratio Prot		0.50	0.35		c0.11	
v/s Ratio Perm	c0.64			0.08		0.03
v/c Ratio	0.78	0.62	0.43	0.10	0.88	0.23
Uniform Delay, d1	6.3	4.6	3.5	2.5	55.8	51.0
Progression Factor	1.70	1.10	0.47	0.70	1.00	1.00
Incremental Delay, d2	20.0	0.4	0.0	0.0	31.0	0.6
Delay (s)	30.8	5.5	1.7	1.8	86.8	51.6
Level of Service	C	A	A	A	F	D
Approach Delay (s)		6.8	1.7		75.2	
Approach LOS		A	A		E	

Intersection Summary			
HCM Average Control Delay	9.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

28: Main Street & Proj Dwy East

	↗	→	←	↖	↘	↙
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑↑	↑↑↑	↱	↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	5085	5085	1583	1770	1583
Volume (vph)	92	2634	1857	90	97	86
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	97	2773	1955	95	102	91
RTOR Reduction (vph)	0	0	0	25	0	82
Lane Group Flow (vph)	97	2773	1955	70	102	9
Turn Type	Prot			Perm		Perm
Protected Phases	5	2	6		3	
Permitted Phases				6		3
Actuated Green, G (s)	11.6	109.5	93.9	93.9	12.5	12.5
Effective Green, g (s)	11.6	109.5	93.9	93.9	12.5	12.5
Actuated g/C Ratio	0.09	0.84	0.72	0.72	0.10	0.10
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	158	4283	3673	1143	170	152
v/s Ratio Prot	0.05	c0.55	0.38		c0.06	
v/s Ratio Perm				0.04		0.01
v/c Ratio	0.61	0.65	0.53	0.06	0.60	0.06
Uniform Delay, d1	57.0	3.6	8.1	5.2	56.4	53.4
Progression Factor	1.34	0.16	0.34	0.18	1.00	1.00
Incremental Delay, d2	1.9	0.2	0.3	0.1	5.6	0.2
Delay (s)	78.2	0.8	3.0	1.0	62.0	53.6
Level of Service	E	A	A	A	E	D
Approach Delay (s)		3.4	2.9		58.0	
Approach LOS		A	A		E	

Intersection Summary			
HCM Average Control Delay	5.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		0.97	0.95		1.00	0.95	
Frt	1.00	0.86		1.00	0.97		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1608		1770	1815		3433	3414		1770	3521	
Flt Permitted	0.71	1.00		0.18	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1331	1608		341	1815		3433	3414		1770	3521	
Volume (vph)	22	50	506	147	50	10	521	470	144	12	630	22
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	54	550	160	54	11	566	511	157	13	685	24
RTOR Reduction (vph)	0	241	0	0	6	0	0	30	0	0	3	0
Lane Group Flow (vph)	24	363	0	160	59	0	566	638	0	13	706	0
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	39.0	39.0		39.0	39.0		16.6	39.9		0.8	24.1	
Effective Green, g (s)	39.0	39.0		39.0	39.0		16.6	39.9		0.8	24.1	
Actuated g/C Ratio	0.43	0.43		0.43	0.43		0.18	0.44		0.01	0.26	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	566	684		145	772		621	1485		15	925	
v/s Ratio Prot		0.23			0.03		c0.16	0.19		0.01	c0.20	
v/s Ratio Perm	0.02			c0.47								
v/c Ratio	0.04	0.53		1.10	0.08		0.91	0.43		0.87	0.76	
Uniform Delay, d1	15.4	19.6		26.4	15.6		36.8	18.0		45.4	31.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.8		105.2	0.0		17.7	0.2		162.9	3.8	
Delay (s)	15.5	20.3		131.5	15.7		54.5	18.2		208.3	35.0	
Level of Service	B	C		F	B		D	B		F	C	
Approach Delay (s)		20.2			98.1			34.9			38.1	
Approach LOS		C			F			C			D	

Intersection Summary			
HCM Average Control Delay	37.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	91.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION     1 Minaker/Wilbur                    Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            20   10   10
                        |   |   |
             ^          |   |   |         ^
             |        <---   v   --->      | Split? N
LEFT    10 ---  1.0   1.0  1.1  1.1   1.1 ---   10  RIGHT
                                                          STREET NAME:
THRU   841 ---> 2.1  (NO. OF LANES)   2.1<---  481  THRU  Wilbur

RIGHT  190 ---  1.1   1.1  1.1  1.0   1.0 ---   50  LEFT
             |        <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  70    0   50                         Urb=N, Rur=Y
  S                   LEFT THRU RIGHT Split? N

               STREET NAME: Minaker
========================================================================
               ORIGINAL   ADJUSTED                 V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO        V/C
------------------------------------------------------------------------
NB  RIGHT (R)      50          0 *     1650     0.0000
    THRU (T)        0          0       1650     0.0000
    LEFT (L)       70         70       1650     0.0424     0.0424
    T + L                     70       1650     0.0424
------------------------------------------------------------------------
SB  RIGHT (R)      20         10 *     1650     0.0061
    THRU (T)       10         10       1650     0.0061
    LEFT (L)       10         10       1650     0.0061
    T + L                     20       1650     0.0121     0.0121
------------------------------------------------------------------------
EB  RIGHT (R)     190        190       1650     0.1152
    THRU (T)      841        841       3300     0.2548
    LEFT (L)       10         10       1650     0.0061
    T + R                   1031       3300     0.3124     0.3124
------------------------------------------------------------------------
WB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      481        481       3300     0.1458
    LEFT (L)       50         50       1650     0.0303     0.0303
    T + R                    491       3300     0.1488
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.40
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION     6 Hillcrest/18th St                 Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            60  140   80
                        |   |   |
             ^          |   |   |         ^
             |        <---   v   --->      | Split? N
LEFT    70 ---  1.0   1.0  1.0  1.0   1.1 ---   40  RIGHT
                                                          STREET NAME:
THRU  1021 ---> 2.1  (NO. OF LANES)   2.1<---  581  THRU  18th St

RIGHT  240 ---  1.1   1.0  1.0  1.0   1.0 ---  321  LEFT
             |        <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 190  210  301                         Urb=Y, Rur=Y
  S                   LEFT THRU RIGHT Split? N

               STREET NAME: Hillcrest
========================================================================
               ORIGINAL   ADJUSTED                 V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO        V/C
------------------------------------------------------------------------
NB  RIGHT (R)     301          0 *     1650     0.0000
    THRU (T)      210        210       1650     0.1273
    LEFT (L)      190        190       1650     0.1152     0.1152
------------------------------------------------------------------------
SB  RIGHT (R)      60          0 *     1650     0.0000
    THRU (T)      140        140       1650     0.0848     0.0848
    LEFT (L)       80         80       1650     0.0485
------------------------------------------------------------------------
EB  RIGHT (R)     240        240       1650     0.1455
    THRU (T)     1021       1021       3300     0.3094
    LEFT (L)       70         70       1650     0.0424
    T + R                   1261       3300     0.3821     0.3821
------------------------------------------------------------------------
WB  RIGHT (R)      40         40       1650     0.0242
    THRU (T)      581        581       3300     0.1761
    LEFT (L)      321        321       1650     0.1945     0.1945
    T + R                    621       3300     0.1882
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.78
     INTERSECTION LEVEL OF SERVICE:                             C
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION     7 Viera/18th St                     Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       2-PHASE SIGNAL
-----------           150   80   82
                        |   |   |
             ^          |   |   |         ^
             |        <---   v   --->      | Split? N
LEFT   120 ---  1.0   1.1  1.1  1.1   1.1 ---   93  RIGHT
                                                          STREET NAME:
THRU  1080 ---> 2.0  (NO. OF LANES)   2.1<---  760  THRU  18th St

RIGHT  190 ---  1.0   1.1  1.1  1.0   1.0 ---   30  LEFT
             |        <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 100   20   20                         Urb=Y, Rur=Y
  S                   LEFT THRU RIGHT Split? N

               STREET NAME: Viera
========================================================================
               ORIGINAL   ADJUSTED                 V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO        V/C
------------------------------------------------------------------------
NB  RIGHT (R)      20          0 *     1800     0.0000
    THRU (T)       20         20       1800     0.0111
    LEFT (L)      100        100       1800     0.0556     0.0556
    T + L                    120       1800     0.0667
------------------------------------------------------------------------
SB  RIGHT (R)     150        150       1800     0.0833
    THRU (T)       80         80       1800     0.0444
    LEFT (L)       82         82       1800     0.0456
    T + R                    230       1800     0.1278
    T + L                    162       1800     0.0900
    T + R + L                312       1800     0.1733     0.1733
------------------------------------------------------------------------
EB  RIGHT (R)     190         90 *     1800     0.0500
    THRU (T)     1080       1080       3600     0.3000     0.3000
    LEFT (L)      120        120       1800     0.0667
------------------------------------------------------------------------
WB  RIGHT (R)      93         93       1800     0.0517
    THRU (T)      760        760       3600     0.2111
    LEFT (L)       30         30       1800     0.0167     0.0167
    T + R                    853       3600     0.2369
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.55
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION     8 Phillips Lane/18th Street         Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------           310   10  250
                        |   |   |
             ^          |   |   |         ^
             |        <---   v   --->      | Split? N
LEFT   280 ---  1.0   1.1  1.1  2.0   1.0 ---  230  RIGHT
                                                          STREET NAME:
THRU   933 ---> 2.1  (NO. OF LANES)   2.0<---  614  THRU  18th Street

RIGHT   20 ---  1.1   1.0  1.1  1.1   1.0 ---   20  LEFT
             |        <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  20   10   50                         Urb=Y, Rur=Y
  S                   LEFT THRU RIGHT Split? Y

               STREET NAME: Phillips Lane
========================================================================
               ORIGINAL   ADJUSTED                 V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO        V/C
------------------------------------------------------------------------
NB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)       10         10       1650     0.0061
    LEFT (L)       20         20       1650     0.0121
    T + R                     60       1650     0.0364     0.0364
------------------------------------------------------------------------
SB  RIGHT (R)     310        310       1650     0.1879
    THRU (T)       10         10       1650     0.0061
    LEFT (L)      250        250       3000     0.0833
    T + R                    320       1650     0.1939     0.1939
------------------------------------------------------------------------
EB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)      933        933       3300     0.2827
    LEFT (L)      280        280       1650     0.1697     0.1697
    T + R                    953       3300     0.2888
------------------------------------------------------------------------
WB  RIGHT (R)     230         93 *     1650     0.0564
    THRU (T)      614        614       3300     0.1861     0.1861
    LEFT (L)       20         20       1650     0.0121
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.59
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION     9 SR 160 SB Ramp/Main Street        Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            20   30   90
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    30 ---  1.0   1.1  1.1  1.0   1.0 ---  100  RIGHT
                                                          STREET NAME:
THRU  1053 ---> 2.1  (NO. OF LANES)   2.0<---  754  THRU  Main Street

RIGHT  140 ---  1.1   1.1  1.1  1.9   2.0 --- 1032  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  50   20  228                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 SB Ramp
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     228        228       1650     0.1382
    THRU (T)       20         20       1650     0.0121
    LEFT (L)       50         50       1650     0.0303
    T + L                     70       1650     0.0424     0.0424
------------------------------------------------------------------------
SB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)       30         30       1650     0.0182
    LEFT (L)       90         90       1650     0.0545     0.0545
    T + R                     50       1650     0.0303
------------------------------------------------------------------------
EB  RIGHT (R)     140        140       1650     0.0848
    THRU (T)     1053       1053       3300     0.3191
    LEFT (L)       30         30       1650     0.0182
    T + R                   1193       3300     0.3615     0.3615
------------------------------------------------------------------------
WB  RIGHT (R)     100         10 *     1650     0.0061
    THRU (T)      754        754       3300     0.2285
    LEFT (L)     1032       1032       3000     0.3440     0.3440
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.80
     INTERSECTION LEVEL OF SERVICE:                             C
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION    10 SR 160 NB Ramp/Main Street        Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0    0    0
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  RIGHT
                                                          STREET NAME:
THRU  1211 ---> 3.1  (NO. OF LANES)   3.0<--- 1716  THRU  Main Street

RIGHT  160 ---  1.1   1.0  0.0  2.5   1.0 ---  270  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 170    0 1600                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 NB Ramp
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)    1600       1109 *     3127     0.3547     0.3547
    LEFT (L)      170        170       1720     0.0988
------------------------------------------------------------------------
EB  RIGHT (R)     160        160       1720     0.0930
    THRU (T)     1211       1211       5160     0.2347
    T + R                   1371       5160     0.2657     0.2657
------------------------------------------------------------------------
WB  THRU (T)     1716       1716       5160     0.3326
    LEFT (L)      270        270       1720     0.1570     0.1570
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.78
     INTERSECTION LEVEL OF SERVICE:                             C
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION    11 Neroly/Main Street                Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------           228  181  253
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   164 ---  1.0   1.0  1.0  2.0   1.0 ---  194  RIGHT
                                                          STREET NAME:
THRU  2217 ---> 3.1  (NO. OF LANES)   3.0<--- 1497  THRU  Main Street

RIGHT  430 ---  1.1   2.0  1.1  1.1   1.0 ---  120  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 260  290  100                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Neroly
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     100        100       1650     0.0606
    THRU (T)      290        290       1650     0.1758
    LEFT (L)      260        260       3000     0.0867
    T + R                    390       1650     0.2364     0.2364
------------------------------------------------------------------------
SB  RIGHT (R)     228         64 *     1650     0.0388
    THRU (T)      181        181       1650     0.1097     0.1097
    LEFT (L)      253        253       3000     0.0843
------------------------------------------------------------------------
EB  RIGHT (R)     430        430       1650     0.2606
    THRU (T)     2217       2217       4950     0.4479
    LEFT (L)      164        164       1650     0.0994
    T + R                   2647       4950     0.5347     0.5347
------------------------------------------------------------------------
WB  RIGHT (R)     194         55 *     1650     0.0333
    THRU (T)     1497       1497       4950     0.3024
    LEFT (L)      120        120       1650     0.0727     0.0727
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.95
     INTERSECTION LEVEL OF SERVICE:                             E
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION    12 Sandy/Main Street                 Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------           125    7  194
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   160 ---  1.0   1.1  1.1  1.0   1.1 ---  144  RIGHT
                                                          STREET NAME:
THRU  2200 ---> 3.1  (NO. OF LANES)   3.1<--- 1576  THRU  Main Street

RIGHT  210 ---  1.1   1.0  1.0  1.0   1.0 ---   40  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 110    7  160                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Sandy
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     160        120 *     1650     0.0727     0.0727
    THRU (T)        7          7       1650     0.0042
    LEFT (L)      110        110       1650     0.0667
------------------------------------------------------------------------
SB  RIGHT (R)     125        125       1650     0.0758
    THRU (T)        7          7       1650     0.0042
    LEFT (L)      194        194       1650     0.1176     0.1176
    T + R                    132       1650     0.0800
------------------------------------------------------------------------
EB  RIGHT (R)     210        210       1650     0.1273
    THRU (T)     2200       2200       4950     0.4444
    LEFT (L)      160        160       1650     0.0970
    T + R                   2410       4950     0.4869     0.4869
------------------------------------------------------------------------
WB  RIGHT (R)     144        144       1650     0.0873
    THRU (T)     1576       1576       4950     0.3184
    LEFT (L)       40         40       1650     0.0242     0.0242
    T + R                   1720       4950     0.3475
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.70
     INTERSECTION LEVEL OF SERVICE:                             B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION    13 Live Oak/Main Street              Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------           184  641  458
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   292 ---  1.0   1.1  2.1  2.0   1.1 ---  389  RIGHT
                                                          STREET NAME:
THRU  2054 ---> 3.0  (NO. OF LANES)   3.1<--- 1417  THRU  Main Street

RIGHT  271 ---  1.0   1.0  2.1  1.1   1.0 ---  137  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 218  453  214                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     214        214       1650     0.1297
    THRU (T)      453        453       3300     0.1373
    LEFT (L)      218        218       1650     0.1321     0.1321
    T + R                    667       3300     0.2021
------------------------------------------------------------------------
SB  RIGHT (R)     184        184       1650     0.1115
    THRU (T)      641        641       3300     0.1942
    LEFT (L)      458        458       3000     0.1527
    T + R                    825       3300     0.2500     0.2500
------------------------------------------------------------------------
EB  RIGHT (R)     271         53 *     1650     0.0321
    THRU (T)     2054       2054       4950     0.4149
    LEFT (L)      292        292       1650     0.1770     0.1770
------------------------------------------------------------------------
WB  RIGHT (R)     389        389       1650     0.2358
    THRU (T)     1417       1417       4950     0.2863
    LEFT (L)      137        137       1650     0.0830
    T + R                   1806       4950     0.3648     0.3648
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.92
     INTERSECTION LEVEL OF SERVICE:                             E
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION    14 Big Break/Main Street             Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------           251   40   90
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   297 ---  1.0   1.0  1.1  1.1   1.0 ---   80  RIGHT
                                                          STREET NAME:
THRU  2254 ---> 2.0  (NO. OF LANES)   2.0<--- 1576  THRU  Main Street

RIGHT  180 ---  1.0   1.0  1.1  1.1   1.0 ---   90  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 120   60   90                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Big Break
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      90         90       1650     0.0545
    THRU (T)       60         60       1650     0.0364
    LEFT (L)      120        120       1650     0.0727     0.0727
    T + R                    150       1650     0.0909
------------------------------------------------------------------------
SB  RIGHT (R)     251          0 *     1650     0.0000
    THRU (T)       40         40       1650     0.0242
    LEFT (L)       90         90       1650     0.0545
    T + L                    130       1650     0.0788     0.0788
------------------------------------------------------------------------
EB  RIGHT (R)     180         60 *     1650     0.0364
    THRU (T)     2254       2254       3300     0.6830     0.6830
    LEFT (L)      297        297       1650     0.1800
------------------------------------------------------------------------
WB  RIGHT (R)      80          0 *     1650     0.0000
    THRU (T)     1576       1576       3300     0.4776
    LEFT (L)       90         90       1650     0.0545     0.0545
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.89
     INTERSECTION LEVEL OF SERVICE:                             D
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION    17 Empire Ave/Oakley Road            Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------           150  688  150
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? Y
LEFT   250 ---  2.1   1.0  1.0  1.0   1.0 ---   80  RIGHT
                                                          STREET NAME:
THRU    60 ---> 1.1  (NO. OF LANES)   1.1<---   50  THRU  Oakley Road

RIGHT  380 ---  1.0   1.0  2.1  1.1   1.1 ---   80  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 389  720   30                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire Ave
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      30         30       1650     0.0182
    THRU (T)      720        720       3300     0.2182
    LEFT (L)      389        389       1650     0.2358     0.2358
    T + R                    750       3300     0.2273
------------------------------------------------------------------------
SB  RIGHT (R)     150         13 *     1650     0.0079
    THRU (T)      688        688       1650     0.4170     0.4170
    LEFT (L)      150        150       1650     0.0909
------------------------------------------------------------------------
EB  RIGHT (R)     380          0 *     1650     0.0000
    THRU (T)       60         60       1650     0.0364
    LEFT (L)      250        250       3000     0.0833
    T + L                    310       3000     0.1033     0.1033
------------------------------------------------------------------------
WB  RIGHT (R)      80          0 *     1650     0.0000
    THRU (T)       50         50       1650     0.0303
    LEFT (L)       80         80       1650     0.0485
    T + L                    130       1650     0.0788     0.0788
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.83
     INTERSECTION LEVEL OF SERVICE:                             D
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION    18 Empire Avenue/Main Street         Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------            30   20   30
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    40 ---  1.0   1.0  1.1  1.1   1.1 ---   20  RIGHT
                                                          STREET NAME:
THRU  1859 ---> 2.0  (NO. OF LANES)   2.1<--- 1173  THRU  Main Street

RIGHT  578 ---  1.0   2.0  1.0  1.0   1.0 ---  390  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 590   40  420                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Empire Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     420         30 *     1650     0.0182
    THRU (T)       40         40       1650     0.0242
    LEFT (L)      590        590       3000     0.1967     0.1967
------------------------------------------------------------------------
SB  RIGHT (R)      30          0 *     1650     0.0000
    THRU (T)       20         20       1650     0.0121
    LEFT (L)       30         30       1650     0.0182
    T + L                     50       1650     0.0303     0.0303
------------------------------------------------------------------------
EB  RIGHT (R)     578        254 *     1650     0.1539
    THRU (T)     1859       1859       3300     0.5633     0.5633
    LEFT (L)       40         40       1650     0.0242
------------------------------------------------------------------------
WB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)     1173       1173       3300     0.3555
    LEFT (L)      390        390       1650     0.2364     0.2364
    T + R                   1193       3300     0.3615
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         1.03
     INTERSECTION LEVEL OF SERVICE:                             F
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION    19 Vintage/Main Street               Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------            55    0   90
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    55 ---  1.0   1.0  0.0  1.0   1.1 ---   50  RIGHT
                                                          STREET NAME:
THRU  1124 ---> 2.0  (NO. OF LANES)   2.1<---  969  THRU  Main Street

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Vintage
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)      55          0 *     1720     0.0000
    LEFT (L)       90         90       1720     0.0523    0.0523
------------------------------------------------------------------------
EB  THRU (T)     1124       1124       3440     0.3267
    LEFT (L)       55         55       1720     0.0320    0.0320
------------------------------------------------------------------------
WB  RIGHT (R)      50         50       1720     0.0291
    THRU (T)      969        969       3440     0.2817
    T + R                   1019       3440     0.2962    0.2962
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.38
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION    20 O'Hara Avenue/Main Street         Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            10   40   30
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    20 ---  1.0   1.1  1.1  1.1   1.1 ---   20  RIGHT
                                                          STREET NAME:
THRU  1023 ---> 1.0  (NO. OF LANES)   1.1<---  853  THRU  Main Street

RIGHT  201 ---  1.0   1.0  1.1  1.1   1.0 ---   60  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 205   60   40                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: O'Hara Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      40         40       1650     0.0242
    THRU (T)       60         60       1650     0.0364
    LEFT (L)      205        205       1650     0.1242    0.1242
    T + R                    100       1650     0.0606
------------------------------------------------------------------------
SB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)       40         40       1650     0.0242
    LEFT (L)       30         30       1650     0.0182
    T + R                     50       1650     0.0303
    T + L                     70       1650     0.0424
    T + R + L                 80       1650     0.0485    0.0485
------------------------------------------------------------------------
EB  RIGHT (R)     201          0 *     1650     0.0000
    THRU (T)     1023       1023       1650     0.6200    0.6200
    LEFT (L)       20         20       1650     0.0121
------------------------------------------------------------------------
WB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)      853        853       1650     0.5170
    LEFT (L)       60         60       1650     0.0364    0.0364
    T + R                    873       1650     0.5291
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.83
     INTERSECTION LEVEL OF SERVICE:                             D
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION    21 Empire Avenue/Cypress Road        Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0  877  321
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  2.0  1.0   1.0 ---  323  RIGHT
                                                          STREET NAME:
THRU     0 ---> 0.0  (NO. OF LANES)   0.0<---    0  THRU  Cypress Road

RIGHT    0 ---  0.0   0.0  2.1  1.1   1.0 ---  150  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0  887  220                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     220        220       1720     0.1279
    THRU (T)      887        887       3440     0.2578
    T + R                   1107       3440     0.3218    0.3218
------------------------------------------------------------------------
SB  THRU (T)      877        877       3440     0.2549
    LEFT (L)      321        321       1720     0.1866    0.1866
------------------------------------------------------------------------
WB  RIGHT (R)     323          2 *     1720     0.0012
    LEFT (L)      150        150       1720     0.0872    0.0872
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.60
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION    22 Main Street/Cypress               Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            20 1033 1080
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   100 ---  1.0   1.1  2.1  2.0   2.6 ---  832  RIGHT
                                                          STREET NAME:
THRU   402 ---> 2.1  (NO. OF LANES)   1.1<---  400  THRU  Cypress

RIGHT   70 ---  1.1   1.0  2.0  1.5   1.0 ---  280  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 130  552  410                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Main Street
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     410        130 *     1650     0.0788
    THRU (T)      552        552       3300     0.1673    0.1673
    LEFT (L)      130        130       1650     0.0788
------------------------------------------------------------------------
SB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)     1033       1033       3300     0.3130
    LEFT (L)     1080       1080       3000     0.3600    0.3600
    T + R                   1053       3300     0.3191
------------------------------------------------------------------------
EB  RIGHT (R)      70         70       1650     0.0424
    THRU (T)      402        402       3300     0.1218
    LEFT (L)      100        100       1650     0.0606
    T + R                    472       3300     0.1430    0.1430
------------------------------------------------------------------------
WB  RIGHT (R)     832        238 *     3000     0.0793
    THRU (T)      400        400       1650     0.2424
    LEFT (L)      280        280       1650     0.1697    0.1697
    T + R                    638       3000     0.2127
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.84
     INTERSECTION LEVEL OF SERVICE:                             D
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION    24 Live Oak/Laurel                   Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------           382    0  397
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   740 ---  2.0   1.0  0.0  1.0   1.1 ---  197  RIGHT
                                                          STREET NAME:
THRU  1950 ---> 3.0  (NO. OF LANES)   3.1<--- 1430  THRU  Laurel

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)     382          0 *     1720     0.0000
    LEFT (L)      397        397       1720     0.2308      0.2308
------------------------------------------------------------------------
EB  THRU (T)     1950       1950       5160     0.3779
    LEFT (L)      740        740       3127     0.2366      0.2366
------------------------------------------------------------------------
WB  RIGHT (R)     197        197       1720     0.1145
    THRU (T)     1430       1430       5160     0.2771
    T + R                   1627       5160     0.3153      0.3153
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.78
     INTERSECTION LEVEL OF SERVICE:                             C
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION    25 Empire/Laurel                     Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------           400  486  182
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   550 ---  1.0   1.1  2.1  1.0   1.1 ---  122  RIGHT
                                                          STREET NAME:
THRU  1517 ---> 2.1  (NO. OF LANES)   2.1<--- 1067  THRU  Laurel

RIGHT  310 ---  1.1   1.0  2.1  1.1   1.0 ---  110  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 160  545  120                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     120        120       1650     0.0727
    THRU (T)      545        545       3300     0.1652
    LEFT (L)      160        160       1650     0.0970      0.0970
    T + R                    665       3300     0.2015
------------------------------------------------------------------------
SB  RIGHT (R)     400        400       1650     0.2424
    THRU (T)      486        486       3300     0.1473
    LEFT (L)      182        182       1650     0.1103
    T + R                    886       3300     0.2685      0.2685
------------------------------------------------------------------------
EB  RIGHT (R)     310        310       1650     0.1879
    THRU (T)     1517       1517       3300     0.4597
    LEFT (L)      550        550       1650     0.3333      0.3333
    T + R                   1827       3300     0.5536
------------------------------------------------------------------------
WB  RIGHT (R)     122        122       1650     0.0739
    THRU (T)     1067       1067       3300     0.3233
    LEFT (L)      110        110       1650     0.0667
    T + R                   1189       3300     0.3603      0.3603
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         1.06
     INTERSECTION LEVEL OF SERVICE:                             F
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION    26 Bridgehead/Proj Dwy #1            Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0  503   80
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   0.0  1.0  1.0   1.0 ---   81  RIGHT
                                                          STREET NAME:
THRU     0 ---> 0.0  (NO. OF LANES)   0.0<---    0  THRU  Proj Dwy #1

RIGHT    0 ---  0.0   0.0  1.0  1.0   1.0 ---  159  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0  494  154                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Bridgehead
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     154          0 *     1720     0.0000
    THRU (T)      494        494       1720     0.2872      0.2872
------------------------------------------------------------------------
SB  THRU (T)      503        503       1720     0.2924
    LEFT (L)       80         80       1720     0.0465      0.0465
------------------------------------------------------------------------
WB  RIGHT (R)      81          1 *     1720     0.0006
    LEFT (L)      159        159       1720     0.0924      0.0924
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.43
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION    27 Proj Dwy Center/Main Street       Oakley
Count Date                   Time                Peak Hour
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------            93    0  189
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   126 ---  1.0   1.0  0.0  1.0   1.0 ---  152  RIGHT
                                                          STREET NAME:
THRU  2429 ---> 3.0  (NO. OF LANES)   3.0<--- 1667  THRU  Main Street

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Proj Dwy Center
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)      93          0 *     1720     0.0000
    LEFT (L)      189        189       1720     0.1099      0.1099
------------------------------------------------------------------------
EB  THRU (T)     2429       2429       5160     0.4707      0.4707
    LEFT (L)      126        126       1720     0.0733
------------------------------------------------------------------------
WB  RIGHT (R)     152          0 *     1720     0.0000
    THRU (T)     1667       1667       5160     0.3231
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.58
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION    28 Proj Dwy East/Main Street         Oakley
Count Date                   Time                Peak Hour
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------            86    0   97
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    92 ---  1.0   1.0  0.0  1.0   1.0 ---   90  RIGHT
                                                          STREET NAME:
THRU  2634 ---> 3.0  (NO. OF LANES)   3.0<--- 1857  THRU  Main Street

RIGHT    0 ---  0.0   0.0  0.0  0.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Proj Dwy East
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)      86          0 *     1720     0.0000
    LEFT (L)       97         97       1720     0.0564     0.0564
------------------------------------------------------------------------
EB  THRU (T)     2634       2634       5160     0.5105     0.5105
    LEFT (L)       92         92       1720     0.0535
------------------------------------------------------------------------
WB  RIGHT (R)      90          0 *     1720     0.0000
    THRU (T)     1857       1857       5160     0.3599
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.57
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 Plus Project NO RAMPS                           11/03/06
========================================================================
INTERSECTION    29 Proj Dwy/Live Oak Ave             Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            22  630   12
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    22 ---  1.0   1.1  2.1  1.0   1.1 ---   10  RIGHT
                                                          STREET NAME:
THRU    50 ---> 1.1  (NO. OF LANES)   1.1<---   50  THRU  Live Oak Ave

RIGHT  506 ---  1.1   2.0  2.1  1.1   1.0 ---  147  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 521  470  144                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Proj Dwy
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     144        144       1650     0.0873
    THRU (T)      470        470       3300     0.1424
    LEFT (L)      521        521       3000     0.1737     0.1737
    T + R                    614       3300     0.1861
------------------------------------------------------------------------
SB  RIGHT (R)      22         22       1650     0.0133
    THRU (T)      630        630       3300     0.1909
    LEFT (L)       12         12       1650     0.0073
    T + R                    652       3300     0.1976     0.1976
------------------------------------------------------------------------
EB  RIGHT (R)     506        506       1650     0.3067
    THRU (T)       50         50       1650     0.0303
    LEFT (L)       22         22       1650     0.0133
    T + R                    556       1650     0.3370     0.3370
------------------------------------------------------------------------
WB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)       50         50       1650     0.0303
    LEFT (L)      147        147       1650     0.0891     0.0891
    T + R                     60       1650     0.0364
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.80
     INTERSECTION LEVEL OF SERVICE:                             C
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

Cumulative (2030) With Project AM
(Without Connector Ramps)
Mitigation

HCM Signalized Intersection Capacity Analysis
3: Wilbur Avenue & SR 160 SB Off

2010 PM & Proj no Ramps
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↱		↰	↑↑					↰		↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0					4.0		4.0
Lane Util. Factor		1.00		1.00	0.95					1.00		1.00
Frt		0.97		1.00	1.00					1.00		0.85
Flt Protected		1.00		0.95	1.00					0.95		1.00
Satd. Flow (prot)		1814		1770	3539					1770		1583
Flt Permitted		1.00		0.95	1.00					0.95		1.00
Satd. Flow (perm)		1814		1770	3539					1770		1583
Volume (vph)	0	376	90	240	669	0	0	0	0	251	0	140
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	396	95	253	704	0	0	0	0	264	0	147
RTOR Reduction (vph)	0	13	0	0	0	0	0	0	0	0	0	113
Lane Group Flow (vph)	0	478	0	253	704	0	0	0	0	264	0	34
Turn Type				Prot						custom		custom
Protected Phases		2		1	6							
Permitted Phases										7		7
Actuated Green, G (s)		22.7		10.5	37.7					13.3		13.3
Effective Green, g (s)		23.2		11.0	38.2					13.8		13.8
Actuated g/C Ratio		0.39		0.18	0.64					0.23		0.23
Clearance Time (s)		4.5		4.5	4.5					4.5		4.5
Vehicle Extension (s)		3.0		3.0	3.0					3.0		3.0
Lane Grp Cap (vph)		701		325	2253					407		364
v/s Ratio Prot		c0.26		c0.14	0.20							
v/s Ratio Perm										c0.15		0.02
v/c Ratio		0.68		0.78	0.31					0.65		0.09
Uniform Delay, d1		15.3		23.3	4.9					20.9		18.2
Progression Factor		1.00		0.95	0.53					1.00		1.00
Incremental Delay, d2		5.3		9.5	0.3					3.5		0.1
Delay (s)		20.6		31.6	2.9					24.5		18.3
Level of Service		C		C	A					C		B
Approach Delay (s)		20.6			10.5			0.0			22.2	
Approach LOS		C			B			A			C	

Intersection Summary			
HCM Average Control Delay	15.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
4: Wilbur Avenue & SR 160 NB On

2010 PM & Proj no Ramps
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑			↑↱		↰		↗			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0		4.0			
Lane Util. Factor	1.00	0.95			0.95		1.00		1.00			
Frt	1.00	1.00			0.96		1.00		0.85			
Flt Protected	0.95	1.00			1.00		0.95		1.00			
Satd. Flow (prot)	1770	3539			3393		1770		1583			
Flt Permitted	0.95	1.00			1.00		0.95		1.00			
Satd. Flow (perm)	1770	3539			3393		1770		1583			
Volume (vph)	80	547	0	0	719	275	190	0	230	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	576	0	0	757	289	200	0	242	0	0	0
RTOR Reduction (vph)	0	0	0	0	55	0	0	0	192	0	0	0
Lane Group Flow (vph)	84	576	0	0	991	0	200	0	50	0	0	0
Turn Type	Prot						custom		custom			
Protected Phases	5	2			6							
Permitted Phases							3		3			
Actuated Green, G (s)	4.4	39.2			30.3		11.8		11.8			
Effective Green, g (s)	4.9	39.7			30.8		12.3		12.3			
Actuated g/C Ratio	0.08	0.66			0.51		0.21		0.21			
Clearance Time (s)	4.5	4.5			4.5		4.5		4.5			
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Lane Grp Cap (vph)	145	2342			1742		363		325			
v/s Ratio Prot	c0.05	0.16			c0.29							
v/s Ratio Perm							c0.11		0.03			
v/c Ratio	0.58	0.25			0.57		0.55		0.15			
Uniform Delay, d1	26.6	4.1			10.0		21.4		19.6			
Progression Factor	0.82	0.30			0.65		1.00		1.00			
Incremental Delay, d2	4.1	0.2			0.8		1.8		0.2			
Delay (s)	25.9	1.4			7.3		23.2		19.8			
Level of Service	C	A			A		C		B			
Approach Delay (s)		4.5			7.3			21.3			0.0	
Approach LOS		A			A			C			A	

Intersection Summary			
HCM Average Control Delay	9.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
5: Wilbur Avenue & Bridgehead Road

2010 PM & Proj no Ramps
11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱			✥	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Frt	1.00	0.95		1.00	1.00		1.00	0.88			0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1770	1773		1770	1857		1770	1636			1765	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00			0.91	
Satd. Flow (perm)	1770	1773		1770	1857		1770	1636			1622	
Volume (vph)	30	506	240	30	533	10	441	30	130	10	30	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	533	253	32	561	11	464	32	137	11	32	21
RTOR Reduction (vph)	0	12	0	0	0	0	0	89	0	0	16	0
Lane Group Flow (vph)	32	774	0	32	572	0	464	80	0	0	48	0
Turn Type	Prot			Prot			Prot			Perm		
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases										4		
Actuated Green, G (s)	5.0	62.9		2.4	60.3		30.0	42.2			7.7	
Effective Green, g (s)	5.0	62.9		2.9	60.8		30.0	42.2			8.2	
Actuated g/C Ratio	0.04	0.52		0.02	0.51		0.25	0.35			0.07	
Clearance Time (s)	4.0	4.0		4.5	4.5		4.0	4.0			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	74	929		43	941		443	575			111	
v/s Ratio Prot	0.02	c0.44		0.02	c0.31		c0.26	0.05				
v/s Ratio Perm											c0.03	
v/c Ratio	0.43	0.83		0.74	0.61		1.05	0.14			0.43	
Uniform Delay, d1	56.1	24.1		58.2	21.1		45.0	26.5			53.7	
Progression Factor	0.98	0.86		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	3.9	8.4		50.5	2.9		55.7	0.1			2.7	
Delay (s)	59.0	29.2		108.6	24.0		100.7	26.6			56.4	
Level of Service	E	C		F	C		F	C			E	
Approach Delay (s)		30.4			28.5			80.9			56.4	
Approach LOS		C			C			F			E	

Intersection Summary			
HCM Average Control Delay	45.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
11: Main Street & Bridgehead Road

2030 AM & Proj no Ramps MITIGATION
12/18/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↑	↗	↰	↰↱		↰↰	↑	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00	0.91	0.91		0.97	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	0.99		0.95	1.00	1.00
Satd. Flow (prot)	1719	4839		1719	4940	1538	1564	3178		3335	1810	1538
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	0.99		0.95	1.00	1.00
Satd. Flow (perm)	1719	4839		1719	4940	1538	1564	3178		3335	1810	1538
Volume (vph)	206	1275	200	80	1291	389	310	239	60	111	254	159
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	217	1342	211	84	1359	409	326	252	63	117	267	167
RTOR Reduction (vph)	0	17	0	0	0	243	0	16	0	0	0	144
Lane Group Flow (vph)	217	1536	0	84	1359	166	209	416	0	117	267	23
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot		Perm	Split			Split		Prot
Protected Phases	5	2		1	6		8	8		7	7	7
Permitted Phases						6						
Actuated Green, G (s)	12.0	45.6		6.0	39.6	39.6	17.4	17.4		14.0	14.0	14.0
Effective Green, g (s)	12.0	46.6		6.0	40.6	40.6	17.4	17.4		14.0	14.0	14.0
Actuated g/C Ratio	0.12	0.47		0.06	0.41	0.41	0.17	0.17		0.14	0.14	0.14
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	206	2255		103	2006	624	272	553		467	253	215
v/s Ratio Prot	c0.13	0.32		0.05	c0.28		c0.13	0.13		0.04	c0.15	0.02
v/s Ratio Perm						0.11						
v/c Ratio	1.05	0.68		0.82	0.68	0.27	0.77	0.75		0.25	1.06	0.11
Uniform Delay, d1	44.0	20.9		46.5	24.3	19.8	39.4	39.3		38.3	43.0	37.6
Progression Factor	1.05	1.07		1.10	0.30	0.78	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	69.6	1.3		31.6	1.6	0.9	11.1	5.1		0.1	71.9	0.1
Delay (s)	116.0	23.6		82.7	8.8	16.4	50.5	44.4		38.4	114.9	37.6
Level of Service	F	C		F	A	B	D	D		D	F	D
Approach Delay (s)		34.9			13.9			46.4			75.2	
Approach LOS		C			B			D			E	

Intersection Summary			
HCM Average Control Delay	32.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	74.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

13: Main Street & Live Oak Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑↑	↱	↰	↑↑↑↱		↰	↑↑↱		↰↰	↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91		1.00	0.95		0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	4940	1538	1719	4838		1719	3457		3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	4940	1538	1719	4838		1719	3457		3433	3539	1583
Volume (vph)	221	1117	122	97	1602	326	184	517	77	156	284	58
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	233	1176	128	102	1686	343	194	544	81	164	299	61
RTOR Reduction (vph)	0	0	71	0	29	0	0	12	0	0	0	53
Lane Group Flow (vph)	233	1176	57	102	2000	0	194	613	0	164	299	8
Heavy Vehicles (%)	2%	5%	5%	5%	5%	2%	5%	2%	5%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2		6							4
Actuated Green, G (s)	7.8	43.8	43.8	9.6	45.6		15.3	22.6		7.0	13.3	13.3
Effective Green, g (s)	7.8	44.8	44.8	9.6	46.6		16.3	22.6		7.0	13.3	13.3
Actuated g/C Ratio	0.08	0.45	0.45	0.10	0.47		0.16	0.23		0.07	0.13	0.13
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		5.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	268	2213	689	165	2255		280	781		240	471	211
v/s Ratio Prot	c0.07	0.24		0.06	c0.41		0.11	c0.18		0.05	c0.08	
v/s Ratio Perm			0.04									0.01
v/c Ratio	0.87	0.53	0.08	0.62	0.89		0.69	0.78		0.68	0.63	0.04
Uniform Delay, d1	45.6	20.0	15.8	43.4	24.3		39.5	36.4		45.4	41.1	37.8
Progression Factor	0.89	0.26	0.03	0.86	0.39		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	23.7	0.9	0.2	6.1	5.1		7.2	5.2		7.8	2.8	0.1
Delay (s)	64.4	6.0	0.7	43.4	14.6		46.7	41.6		53.2	43.8	37.9
Level of Service	E	A	A	D	B		D	D		D	D	D
Approach Delay (s)		14.4			16.0			42.8			46.1	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM Average Control Delay	23.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

15: Oakley Road & Neroly Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.94		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1784		1770	1750		1770	1850		1770	1848	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1784		1770	1750		1770	1850		1770	1848	
Volume (vph)	20	77	30	20	226	153	200	416	20	93	361	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	81	32	21	238	161	211	438	21	98	380	21
RTOR Reduction (vph)	0	22	0	0	37	0	0	2	0	0	3	0
Lane Group Flow (vph)	21	91	0	21	362	0	211	457	0	98	398	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	0.7	14.3		0.7	14.3		9.5	21.5		4.5	16.5	
Effective Green, g (s)	0.7	14.3		0.7	14.3		9.5	21.5		4.5	16.5	
Actuated g/C Ratio	0.01	0.25		0.01	0.25		0.17	0.38		0.08	0.29	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	22	448		22	439		295	698		140	535	
v/s Ratio Prot	c0.01	0.05		0.01	c0.21		c0.12	c0.25		0.06	0.22	
v/s Ratio Perm												
v/c Ratio	0.95	0.20		0.95	0.82		0.72	0.65		0.70	0.74	
Uniform Delay, d1	28.1	16.9		28.1	20.2		22.5	14.7		25.6	18.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	169.9	0.2		169.9	11.9		8.0	2.2		14.2	5.6	
Delay (s)	198.0	17.1		198.0	32.0		30.5	16.9		39.8	23.9	
Level of Service	F	B		F	C		C	B		D	C	
Approach Delay (s)		45.4			40.3			21.2			27.0	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	29.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	57.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

16: Oakley Road & Live Oak Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑	↱	↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1832		1770	1863	1583	1770	1838		1770	1832	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1832		1770	1863	1583	1770	1838		1770	1832	
Volume (vph)	28	160	20	70	280	213	50	516	50	115	301	37
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	29	168	21	74	295	224	53	543	53	121	317	39
RTOR Reduction (vph)	0	6	0	0	0	168	0	5	0	0	5	0
Lane Group Flow (vph)	29	183	0	74	295	56	53	591	0	121	351	0
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	1.3	13.9		4.3	16.9	16.9	3.0	27.9		5.8	30.7	
Effective Green, g (s)	1.3	13.9		4.3	16.9	16.9	3.0	27.9		5.8	30.7	
Actuated g/C Ratio	0.02	0.20		0.06	0.25	0.25	0.04	0.41		0.09	0.45	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	34	375		112	464	394	78	755		151	828	
v/s Ratio Prot	0.02	0.10		c0.04	c0.16		0.03	c0.32		c0.07	c0.19	
v/s Ratio Perm						0.04						
v/c Ratio	0.85	0.49		0.66	0.64	0.14	0.68	0.78		0.80	0.42	
Uniform Delay, d1	33.2	23.9		31.1	22.8	19.9	32.0	17.4		30.5	12.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	95.5	1.0		13.7	2.8	0.2	21.0	5.3		25.4	0.4	
Delay (s)	128.7	24.9		44.8	25.6	20.0	53.0	22.7		55.9	13.0	
Level of Service	F	C		D	C	C	D	C		E	B	
Approach Delay (s)		38.7			25.9			25.2			23.9	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	26.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	67.9	Sum of lost time (s)	20.0
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

17: Oakley Road & Empire Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↑	↱		↰↑	↱	↰	↑↑↱		↰	↑↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00		1.00	0.97	
Flt Protected	0.95	0.96	1.00		0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1681	1696	1583		1804	1583	1770	3524		1770	3428	
Flt Permitted	0.95	0.96	1.00		0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1681	1696	1583		1804	1583	1770	3524		1770	3428	
Volume (vph)	140	10	225	20	10	20	433	684	20	50	417	110
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	147	11	237	21	11	21	456	720	21	53	439	116
RTOR Reduction (vph)	0	0	225	0	0	20	0	1	0	0	23	0
Lane Group Flow (vph)	77	81	12	0	32	1	456	740	0	53	532	0
Turn Type	Split		Perm	Split		Perm	Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	4.0	4.0	4.0		4.6	4.6	20.0	49.4		3.0	32.4	
Effective Green, g (s)	4.0	4.0	4.0		5.6	5.6	21.0	50.4		4.0	33.4	
Actuated g/C Ratio	0.05	0.05	0.05		0.07	0.07	0.26	0.63		0.05	0.42	
Clearance Time (s)	4.0	4.0	4.0		5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	84	85	79		126	111	465	2220		89	1431	
v/s Ratio Prot	0.05	c0.05			c0.02		c0.26	0.21		0.03	c0.16	
v/s Ratio Perm			0.01			0.00						
v/c Ratio	0.92	0.95	0.15		0.25	0.01	0.98	0.33		0.60	0.37	
Uniform Delay, d1	37.8	37.9	36.4		35.2	34.6	29.3	6.9		37.2	16.1	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		0.64	0.55	
Incremental Delay, d2	70.2	81.4	0.9		1.1	0.0	36.5	0.4		8.9	0.6	
Delay (s)	108.1	119.3	37.3		36.3	34.7	65.8	7.3		32.5	9.6	
Level of Service	F	F	D		D	C	E	A		C	A	
Approach Delay (s)		67.9			35.6			29.6			11.6	
Approach LOS		E			D			C			B	

Intersection Summary			
HCM Average Control Delay	31.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	59.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

18: Main Street & Charles Way

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰↰	↑↱		↰↰	↑	↱		↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.97	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.98	1.00
Satd. Flow (prot)	1719	3539	1538	3433	3531		3335	1810	1583		1797	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.98	1.00
Satd. Flow (perm)	1719	3539	1538	3433	3531		3335	1810	1583		1797	1538
Volume (vph)	20	868	277	260	1323	20	564	20	260	20	40	50
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	914	292	274	1393	21	594	21	274	21	42	53
RTOR Reduction (vph)	0	0	67	0	1	0	0	0	68	0	0	51
Lane Group Flow (vph)	21	914	225	274	1413	0	594	21	206	0	63	2
Heavy Vehicles (%)	5%	2%	5%	2%	2%	2%	5%	5%	2%	2%	5%	5%
Turn Type	Prot		pm+ov	Prot			Split		pm+ov	Split		Perm
Protected Phases	7	4	2	3	8		2	2	3	6	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	1.6	28.1	50.8	7.0	33.5		22.7	22.7	29.7		3.2	3.2
Effective Green, g (s)	2.6	29.1	52.8	8.0	34.5		23.7	23.7	31.7		3.2	3.2
Actuated g/C Ratio	0.03	0.36	0.66	0.10	0.43		0.30	0.30	0.40		0.04	0.04
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	56	1287	1092	343	1523		988	536	627		72	62
v/s Ratio Prot	0.01	0.26	0.06	c0.08	c0.40		c0.18	0.01	0.03		c0.04	
v/s Ratio Perm			0.09						0.10			0.00
v/c Ratio	0.38	0.71	0.21	0.80	0.93		0.60	0.04	0.33		0.88	0.03
Uniform Delay, d1	37.9	21.8	5.4	35.2	21.6		24.1	20.0	16.8		38.2	36.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.75	0.69	0.51		1.00	1.00
Incremental Delay, d2	4.2	1.9	0.1	12.2	10.1		2.5	0.1	0.3		64.5	0.2
Delay (s)	42.1	23.7	5.4	47.4	31.7		20.6	13.9	8.8		102.7	37.1
Level of Service	D	C	A	D	C		C	B	A		F	D
Approach Delay (s)		19.7			34.2			16.8			72.8	
Approach LOS		B			C			B			E	

Intersection Summary			
HCM Average Control Delay	26.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

23: Neroly Road & Live Oak Ave

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.90		1.00	0.94		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3401		1770	3201		1770	1760		1770	1795	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3401		1770	3201		1770	1760		1770	1795	
Volume (vph)	20	271	95	120	193	337	277	206	120	229	62	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	285	100	126	203	355	292	217	126	241	65	21
RTOR Reduction (vph)	0	47	0	0	257	0	0	27	0	0	15	0
Lane Group Flow (vph)	21	338	0	126	301	0	292	316	0	241	71	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	1.3	12.9		5.8	17.4		14.1	19.0		9.6	14.5	
Effective Green, g (s)	1.3	12.9		5.8	17.4		14.1	19.0		9.6	14.5	
Actuated g/C Ratio	0.02	0.20		0.09	0.27		0.22	0.30		0.15	0.23	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	36	693		162	880		394	528		268	411	
v/s Ratio Prot	0.01	c0.10		c0.07	0.09		c0.17	c0.18		c0.14	0.04	
v/s Ratio Perm												
v/c Ratio	0.58	0.49		0.78	0.34		0.74	0.60		0.90	0.17	
Uniform Delay, d1	30.7	22.3		28.1	18.4		22.9	18.9		26.4	19.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	21.8	0.5		20.6	0.2		7.3	1.8		29.8	0.2	
Delay (s)	52.6	22.8		48.7	18.6		30.2	20.7		56.2	19.8	
Level of Service	D	C		D	B		C	C		E	B	
Approach Delay (s)		24.4			24.1			25.1			46.6	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM Average Control Delay	28.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	63.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

25: Laurel Road & Empire Avenue

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	260	725	150	60	1388	261	170	556	50	51	328	460
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	274	763	158	63	1461	275	179	585	53	54	345	484
RTOR Reduction (vph)	0	0	83	0	0	121	0	0	41	0	0	13
Lane Group Flow (vph)	274	763	75	63	1461	154	179	585	12	54	345	471
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		pm+ov
Protected Phases	7	4		3	8		5	2		1	6	7
Permitted Phases			4			8			2			6
Actuated Green, G (s)	10.0	41.8	41.8	6.1	37.9	37.9	9.0	20.8	20.8	3.9	15.7	25.7
Effective Green, g (s)	10.0	41.8	41.8	6.1	37.9	37.9	9.0	20.8	20.8	3.9	15.7	25.7
Actuated g/C Ratio	0.11	0.47	0.47	0.07	0.43	0.43	0.10	0.23	0.23	0.04	0.18	0.29
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	387	1670	747	122	1514	677	180	831	372	78	627	531
v/s Ratio Prot	0.08	c0.22		0.04	c0.41		c0.10	0.17		0.03	0.10	c0.10
v/s Ratio Perm			0.05			0.10			0.01			0.20
v/c Ratio	0.71	0.46	0.10	0.52	0.96	0.23	0.99	0.70	0.03	0.69	0.55	0.89
Uniform Delay, d1	37.9	15.8	13.0	39.8	24.7	16.1	39.8	31.1	26.1	41.8	33.2	30.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.8	0.2	0.1	3.7	15.5	0.2	65.1	2.7	0.0	23.3	1.0	16.2
Delay (s)	43.7	16.0	13.0	43.5	40.2	16.2	104.9	33.8	26.2	65.0	34.3	46.2
Level of Service	D	B	B	D	D	B	F	C	C	E	C	D
Approach Delay (s)		21.9			36.6			48.9			42.7	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM Average Control Delay	36.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	88.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 With Project NO RAMPS MITIGATION                12/18/06
========================================================================
INTERSECTION     3 SR 160 SB Ramps/Wilbur            Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------           140    0  251
                        |   |   |
             ^          |   |   |         ^
             |      <---   v   --->       | Split? N
LEFT     0 ---  0.0   1.0  0.0  1.0   0.0 ---    0  RIGHT
                                                          STREET NAME:
THRU   376 ---> 1.1  (NO. OF LANES)   2.0<---  669  THRU  Wilbur

RIGHT   90 ---  1.1   0.0  0.0  0.0   1.0 ---  240  LEFT
             |      <---   ^   --->       |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=Y, Rur=Y
  S                   LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 SB Ramps
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)      140         140        1720     0.0814
    LEFT (L)       251         251        1720     0.1459     0.1459
------------------------------------------------------------------------
EB  RIGHT (R)       90          90        1720     0.0523
    THRU (T)       376         376        1720     0.2186
    T + R                      466        1720     0.2709     0.2709
------------------------------------------------------------------------
WB  THRU (T)       669         669        3440     0.1945
    LEFT (L)       240         240        1720     0.1395     0.1395
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.56
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 With Project NO RAMPS MITIGATION                12/18/06
========================================================================
INTERSECTION     4 SR 160 NB Ramps/Wilbur            Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0    0    0
                        |   |   |
             ^          |   |   |         ^
             |      <---   v   --->       | Split? N
LEFT    80 ---  1.0   0.0  0.0  0.0   1.1 ---  275  RIGHT
                                                          STREET NAME:
THRU   547 ---> 2.0  (NO. OF LANES)   2.1<---  719  THRU  Wilbur

RIGHT    0 ---  0.0   1.0  0.0  1.0   0.0 ---    0  LEFT
             |      <---   ^   --->       |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 190    0  230                         Urb=Y, Rur=Y
  S                   LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 NB Ramps
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      230         230        1720     0.1337     0.1337
    LEFT (L)       190         190        1720     0.1105
------------------------------------------------------------------------
EB  THRU (T)       547         547        3440     0.1590
    LEFT (L)        80          80        1720     0.0465     0.0465
------------------------------------------------------------------------
WB  RIGHT (R)      275         275        1720     0.1599
    THRU (T)       719         719        3440     0.2090
    T + R                      994        3440     0.2890     0.2890
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.47
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 With Project NO RAMPS MITIGATION                12/18/06
========================================================================
INTERSECTION     5 Bridgehead/Wilbur                 Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            20   30   10
                        |   |   |
             ^          |   |   |         ^
             |      <---   v   --->       | Split? N
LEFT    30 ---  1.0   1.1  1.1  1.1   1.1 ---   10  RIGHT
                                                          STREET NAME:
THRU   506 ---> 1.1  (NO. OF LANES)   1.1<---  533  THRU  Wilbur

RIGHT  240 ---  1.1   1.0  1.1  1.1   1.0 ---   30  LEFT
             |      <---   ^   --->       |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 441   30  130                         Urb=Y, Rur=Y
  S                   LEFT THRU RIGHT Split? N

               STREET NAME: Bridgehead
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      130         130        1650     0.0788
    THRU (T)        30          30        1650     0.0182
    LEFT (L)       441         441        1650     0.2673     0.2673
    T + R                      160        1650     0.0970
------------------------------------------------------------------------
SB  RIGHT (R)       20          20        1650     0.0121
    THRU (T)        30          30        1650     0.0182
    LEFT (L)        10          10        1650     0.0061
    T + R                       50        1650     0.0303
    T + L                       40        1650     0.0242
    T + R + L                   60        1650     0.0364     0.0364
------------------------------------------------------------------------
EB  RIGHT (R)      240         240        1650     0.1455
    THRU (T)       506         506        1650     0.3067
    LEFT (L)        30          30        1650     0.0182
    T + R                      746        1650     0.4521     0.4521
------------------------------------------------------------------------
WB  RIGHT (R)       10          10        1650     0.0061
    THRU (T)       533         533        1650     0.3230
    LEFT (L)        30          30        1650     0.0182     0.0182
    T + R                      543        1650     0.3291
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.77
     INTERSECTION LEVEL OF SERVICE:                             C
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 With Project NO RAMPS MITIGATION                12/18/06
========================================================================
INTERSECTION    11 Bridgehead/Main                   Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------           159  254  111
                        |   |   |
             ^          |   |   |         ^
             |      <---   v   --->       | Split? N
LEFT   206 ---  1.0   1.0  1.0  2.0   1.0 ---  389  RIGHT
                                                          STREET NAME:
THRU  1275 ---> 3.1  (NO. OF LANES)   3.0<--- 1291  THRU  Main

RIGHT  200 ---  1.1   2.1  2.2  1.1   1.0 ---   80  LEFT
             |      <---   ^   --->       |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 310  239   60                         Urb=Y, Rur=Y
  S                   LEFT THRU RIGHT Split? Y

               STREET NAME: Bridgehead
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)       60          60        1650     0.0364
    THRU (T)       239         239        3300     0.0724
    LEFT (L)       310         310        3000     0.1033
    T + R                      299        3300     0.0906
    T + L                      549        4650     0.1181
    T + R + L                  609        4650     0.1310     0.1310
------------------------------------------------------------------------
SB  RIGHT (R)      159           0 *      1650     0.0000
    THRU (T)       254         254        1650     0.1539     0.1539
    LEFT (L)       111         111        3000     0.0370
------------------------------------------------------------------------
EB  RIGHT (R)      200         200        1650     0.1212
    THRU (T)      1275        1275        4950     0.2576
    LEFT (L)       206         206        1650     0.1248     0.1248
    T + R                     1475        4950     0.2980
------------------------------------------------------------------------
WB  RIGHT (R)      389         328 *      1650     0.1988
    THRU (T)      1291        1291        4950     0.2608     0.2608
    LEFT (L)        80          80        1650     0.0485
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.67
     INTERSECTION LEVEL OF SERVICE:                             B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 With Project NO RAMPS MITIGATION                12/18/06
========================================================================
INTERSECTION    13 Live Oak/Main Street              Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            58  284  156
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   221 ---  2.0   1.0  2.0  2.0   1.1 ---  326  RIGHT
                                                          STREET NAME:
THRU  1117 ---> 3.0  (NO. OF LANES)   3.1<--- 1602  THRU  Main Street

RIGHT  122 ---  1.0   1.0  2.1  1.1   1.0 ---   97  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 184  517   77                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY   RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      77         77       1650     0.0467
    THRU (T)      517        517       3300     0.1567
    LEFT (L)      184        184       1650     0.1115
    T + R                    594       3300     0.1800     0.1800
------------------------------------------------------------------------
SB  RIGHT (R)      58          0 *     1650     0.0000
    THRU (T)      284        284       3300     0.0861
    LEFT (L)      156        156       3000     0.0520     0.0520
------------------------------------------------------------------------
EB  RIGHT (R)     122          0 *     1650     0.0000
    THRU (T)     1117       1117       4950     0.2257
    LEFT (L)      221        221       3000     0.0737     0.0737
------------------------------------------------------------------------
WB  RIGHT (R)     326        326       1650     0.1976
    THRU (T)     1602       1602       4950     0.3236
    LEFT (L)       97         97       1650     0.0588
    T + R                   1928       4950     0.3895     0.3895
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                        0.70
     INTERSECTION LEVEL OF SERVICE:                            B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 With Project NO RAMPS MITIGATION                12/18/06
========================================================================
INTERSECTION    15 Neroly/Oakley                     Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            20  361   93
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    20 ---  1.0   1.1  1.1  1.0   1.1 ---  153  RIGHT
                                                          STREET NAME:
THRU    77 ---> 1.1  (NO. OF LANES)   1.1<---  226  THRU  Oakley

RIGHT   30 ---  1.1   1.0  1.1  1.1   1.0 ---   20  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 200  416   20                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Neroly
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY   RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)      416        416       1650     0.2521
    LEFT (L)      200        200       1650     0.1212     0.1212
    T + R                    436       1650     0.2642
------------------------------------------------------------------------
SB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)      361        361       1650     0.2188
    LEFT (L)       93         93       1650     0.0564
    T + R                    381       1650     0.2309     0.2309
------------------------------------------------------------------------
EB  RIGHT (R)      30         30       1650     0.0182
    THRU (T)       77         77       1650     0.0467
    LEFT (L)       20         20       1650     0.0121     0.0121
    T + R                    107       1650     0.0648
------------------------------------------------------------------------
WB  RIGHT (R)     153        153       1650     0.0927
    THRU (T)      226        226       1650     0.1370
    LEFT (L)       20         20       1650     0.0121
    T + R                    379       1650     0.2297     0.2297
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                        0.59
     INTERSECTION LEVEL OF SERVICE:                            A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 With Project NO RAMPS MITIGATION                12/18/06
========================================================================
INTERSECTION    16 Live Oak/Oakley                   Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            37  301  115
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    28 ---  1.0   1.1  1.1  1.0   1.0 ---  213  RIGHT
                                                          STREET NAME:
THRU   160 ---> 1.1  (NO. OF LANES)   1.0<---  280  THRU  Oakley

RIGHT   20 ---  1.1   1.0  1.1  1.1   1.0 ---   70  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  50  516   50                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY   RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)      516        516       1650     0.3127
    LEFT (L)       50         50       1650     0.0303
    T + R                    566       1650     0.3430     0.3430
------------------------------------------------------------------------
SB  RIGHT (R)      37         37       1650     0.0224
    THRU (T)      301        301       1650     0.1824
    LEFT (L)      115        115       1650     0.0697     0.0697
    T + R                    338       1650     0.2048
------------------------------------------------------------------------
EB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)      160        160       1650     0.0970
    LEFT (L)       28         28       1650     0.0170     0.0170
    T + R                    180       1650     0.1091
------------------------------------------------------------------------
WB  RIGHT (R)     213         98 *     1650     0.0594
    THRU (T)      280        280       1650     0.1697     0.1697
    LEFT (L)       70         70       1650     0.0424
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                        0.60
     INTERSECTION LEVEL OF SERVICE:                            A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 With Project NO RAMPS MITIGATION                12/18/06
========================================================================
INTERSECTION    17 Empire/Oakley                     Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------           110  417   50
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? Y
LEFT   140 ---  2.1   1.1  2.1  1.0   1.0 ---   20  RIGHT
                                                          STREET NAME:
THRU    10 ---> 1.1  (NO. OF LANES)   1.1<---   10  THRU  Oakley

RIGHT  225 ---  1.0   1.0  2.1  1.1   1.1 ---   20  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 433  684   20                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY   RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)      684        684       3300     0.2073
    LEFT (L)      433        433       1650     0.2624     0.2624
    T + R                    704       3300     0.2133
------------------------------------------------------------------------
SB  RIGHT (R)     110        110       1650     0.0667
    THRU (T)      417        417       3300     0.1264
    LEFT (L)       50         50       1650     0.0303
    T + R                    527       3300     0.1597     0.1597
------------------------------------------------------------------------
EB  RIGHT (R)     225          0 *     1650     0.0000
    THRU (T)       10         10       1650     0.0061
    LEFT (L)      140        140       3000     0.0467
    T + L                    150       3000     0.0500     0.0500
------------------------------------------------------------------------
WB  RIGHT (R)      20          0 *     1650     0.0000
    THRU (T)       10         10       1650     0.0061
    LEFT (L)       20         20       1650     0.0121
    T + L                     30       1650     0.0182     0.0182
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                        0.49
     INTERSECTION LEVEL OF SERVICE:                            A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
=========================================================================
Condition: 2030 With Project NO RAMPS MITIGATION                 12/18/06
=========================================================================
INTERSECTION    18 Empire Avenue/Main Street         Oakley
Count Date                   Time                Peak Hour AM
-------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                        6-PHASE SIGNAL
-----------            50   40   20
                        |   |   |
            ^           |   |   |          ^
            |        <---   v   --->       | Split? N
LEFT    20 ---  1.0   1.0  1.1  1.1   1.1 ---   20  RIGHT
                                                          STREET NAME:
THRU   868 ---> 2.0  (NO. OF LANES)   2.1<--- 1323  THRU  Main Street

RIGHT  277 ---  1.5   2.0  1.0  1.5   2.0 ---  260  LEFT
            |        <---   ^   --->       |
            v           |   |   |          v
  N                     |   |   |                         SIG WARRANTS:
W + E                 564   20  260                          Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Empire Avenue
=========================================================================
               ORIGINAL   ADJUSTED                 V/C    CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
-------------------------------------------------------------------------
NB  RIGHT (R)     260        117 *      1650     0.0709
    THRU (T)       20         20        1650     0.0121
    LEFT (L)      564        564        3000     0.1880     0.1880
-------------------------------------------------------------------------
SB  RIGHT (R)      50         30 *      1650     0.0182
    THRU (T)       40         40        1650     0.0242
    LEFT (L)       20         20        1650     0.0121
    T + L                     60        1650     0.0364     0.0364
-------------------------------------------------------------------------
EB  RIGHT (R)     277          0 *      1650     0.0000
    THRU (T)      868        868        3300     0.2630
    LEFT (L)       20         20        1650     0.0121     0.0121
-------------------------------------------------------------------------
WB  RIGHT (R)      20         20        1650     0.0121
    THRU (T)     1323       1323        3300     0.4009
    LEFT (L)      260        260        3000     0.0867
    T + R                   1343        3300     0.4070     0.4070
=========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                           0.64
     INTERSECTION LEVEL OF SERVICE:                               B
=========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
=========================================================================
Condition: 2030 With Project NO RAMPS MITIGATION                 12/18/06
=========================================================================
INTERSECTION    23 Live Oak/Neroly                 Oakley
Count Date                   Time                Peak Hour AM
-------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                        8-PHASE SIGNAL
-----------            20   62  229
                        |   |   |
            ^           |   |   |          ^
            |        <---   v   --->       | Split? N
LEFT    20 ---  1.0   1.1  1.1  1.0   1.1 ---  337  RIGHT
                                                          STREET NAME:
THRU   271 ---> 2.1  (NO. OF LANES)   2.1<---  193  THRU  Neroly

RIGHT   95 ---  1.1   1.0  1.1  1.1   1.0 ---  120  LEFT
            |        <---   ^   --->       |
            v           |   |   |          v
  N                     |   |   |                         SIG WARRANTS:
W + E                 277  206  120                          Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
=========================================================================
               ORIGINAL   ADJUSTED                 V/C    CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
-------------------------------------------------------------------------
NB  RIGHT (R)     120        120        1650     0.0727
    THRU (T)      206        206        1650     0.1248
    LEFT (L)      277        277        1650     0.1679
    T + R                    326        1650     0.1976     0.1976
-------------------------------------------------------------------------
SB  RIGHT (R)      20         20        1650     0.0121
    THRU (T)       62         62        1650     0.0376
    LEFT (L)      229        229        1650     0.1388     0.1388
    T + R                     82        1650     0.0497
-------------------------------------------------------------------------
EB  RIGHT (R)      95         95        1650     0.0576
    THRU (T)      271        271        3300     0.0821
    LEFT (L)       20         20        1650     0.0121     0.0121
    T + R                    366        3300     0.1109
-------------------------------------------------------------------------
WB  RIGHT (R)     337        337        1650     0.2042     0.2042
    THRU (T)      193        193        3300     0.0585
    LEFT (L)      120        120        1650     0.0727
    T + R                    530        3300     0.1606
=========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                           0.55
     INTERSECTION LEVEL OF SERVICE:                               A
=========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
=========================================================================
Condition: 2030 With Project NO RAMPS MITIGATION                 12/18/06
=========================================================================
INTERSECTION    25 Empire/Laurel                     Oakley
Count Date                   Time                Peak Hour AM
-------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                        8-PHASE SIGNAL
-----------           460  328   51
                        |   |   |
            ^           |   |   |          ^
            |        <---   v   --->       | Split? N
LEFT   260 ---  2.0   1.0  2.0  1.0   1.0 ---  261  RIGHT
                                                          STREET NAME:
THRU   725 ---> 2.0  (NO. OF LANES)   2.0<--- 1388  THRU  Laurel

RIGHT  150 ---  1.0   1.0  2.0  1.0   1.0 ---   60  LEFT
            |        <---   ^   --->       |
            v           |   |   |          v
  N                     |   |   |                         SIG WARRANTS:
W + E                 170  556   50                          Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire
=========================================================================
               ORIGINAL   ADJUSTED                 V/C    CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
-------------------------------------------------------------------------
NB  RIGHT (R)      50          0 *      1650     0.0000
    THRU (T)      556        556        3300     0.1685
    LEFT (L)      170        170        1650     0.1030     0.1030
-------------------------------------------------------------------------
SB  RIGHT (R)     460        317 *      1650     0.1921     0.1921
    THRU (T)      328        328        3300     0.0994
    LEFT (L)       51         51        1650     0.0309
-------------------------------------------------------------------------
EB  RIGHT (R)     150          0 *      1650     0.0000
    THRU (T)      725        725        3300     0.2197
    LEFT (L)      260        260        3000     0.0867     0.0867
-------------------------------------------------------------------------
WB  RIGHT (R)     261        210 *      1650     0.1273
    THRU (T)     1388       1388        3300     0.4206     0.4206
    LEFT (L)       60         60        1650     0.0364
=========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                           0.80
     INTERSECTION LEVEL OF SERVICE:                               C
=========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.AM,CAP=
```

Cumulative (2030) With Project PM (Without Connector Ramps) Mitigation

HCM Signalized Intersection Capacity Analysis 2030 PM & Proj no Ramps MITIGATION
3: Wilbur Avenue & SR 160 SB Off 11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↱		↰	↑↑					↰		↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0					4.0		4.0
Lane Util. Factor		1.00		1.00	0.95					1.00		1.00
Frt		0.97		1.00	1.00					1.00		0.85
Flt Protected		1.00		0.95	1.00					0.95		1.00
Satd. Flow (prot)		1806		1770	3539					1770		1583
Flt Permitted		1.00		0.95	1.00					0.95		1.00
Satd. Flow (perm)		1806		1770	3539					1770		1583
Volume (vph)	0	694	200	110	494	0	0	0	0	293	0	100
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	731	211	116	520	0	0	0	0	308	0	105
RTOR Reduction (vph)	0	10	0	0	0	0	0	0	0	0	0	84
Lane Group Flow (vph)	0	932	0	116	520	0	0	0	0	308	0	21
Turn Type				Prot						custom		custom
Protected Phases		2		1	6							
Permitted Phases										7		7
Actuated Green, G (s)		59.3		8.1	71.4					19.6		19.6
Effective Green, g (s)		59.8		8.1	71.9					20.1		20.1
Actuated g/C Ratio		0.60		0.08	0.72					0.20		0.20
Clearance Time (s)		4.5		4.0	4.5					4.5		4.5
Vehicle Extension (s)		3.0		3.0	3.0					3.0		3.0
Lane Grp Cap (vph)		1080		143	2545					356		318
v/s Ratio Prot		c0.52		c0.07	0.15							
v/s Ratio Perm										c0.17		0.01
v/c Ratio		0.86		0.81	0.20					0.87		0.07
Uniform Delay, d1		16.7		45.2	4.6					38.6		32.4
Progression Factor		1.00		1.02	0.54					1.00		1.00
Incremental Delay, d2		9.1		26.7	0.2					19.1		0.1
Delay (s)		25.8		72.9	2.7					57.8		32.4
Level of Service		C		E	A					E		C
Approach Delay (s)		25.8			15.5			0.0			51.3	
Approach LOS		C			B			A			D	

Intersection Summary			
HCM Average Control Delay	27.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	81.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis 2030 PM & Proj no Ramps MITIGATION
4: Wilbur Avenue & SR 160 NB On 11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑			↑↑↱		↰		↱			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0		4.0			
Lane Util. Factor	1.00	0.95			0.95		1.00		1.00			
Frt	1.00	1.00			0.96		1.00		0.85			
Flt Protected	0.95	1.00			1.00		0.95		1.00			
Satd. Flow (prot)	1770	3539			3387		1770		1583			
Flt Permitted	0.95	1.00			1.00		0.95		1.00			
Satd. Flow (perm)	1770	3539			3387		1770		1583			
Volume (vph)	350	637	0	0	554	222	50	0	80	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	368	671	0	0	583	234	53	0	84	0	0	0
RTOR Reduction (vph)	0	0	0	0	29	0	0	0	78	0	0	0
Lane Group Flow (vph)	368	671	0	0	788	0	53	0	6	0	0	0
Turn Type	Prot						custom		custom			
Protected Phases	5	2			6							
Permitted Phases							3		3			
Actuated Green, G (s)	24.8	83.8			54.5		7.2		7.2			
Effective Green, g (s)	25.3	84.3			55.0		7.7		7.7			
Actuated g/C Ratio	0.25	0.84			0.55		0.08		0.08			
Clearance Time (s)	4.5	4.5			4.5		4.5		4.5			
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Lane Grp Cap (vph)	448	2983			1863		136		122			
v/s Ratio Prot	c0.21	0.19			c0.23							
v/s Ratio Perm							c0.03		0.00			
v/c Ratio	0.82	0.22			0.42		0.39		0.05			
Uniform Delay, d1	35.2	1.5			13.2		43.9		42.8			
Progression Factor	0.97	1.37			0.53		1.00		1.00			
Incremental Delay, d2	6.0	0.1			0.5		1.8		0.2			
Delay (s)	40.2	2.2			7.5		45.8		43.0			
Level of Service	D	A			A		D		D			
Approach Delay (s)		15.6			7.5			44.0			0.0	
Approach LOS		B			A			D			A	

Intersection Summary			
HCM Average Control Delay	14.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	81.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis 2030 PM & Proj no Ramps MITIGATION
5: Wilbur Avenue & Bridgehead Road 11/6/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↱			↰↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Frt	1.00	0.93		1.00	1.00		1.00	0.91			0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1770	1731		1770	1856		1770	1691			1714	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00			0.95	
Satd. Flow (perm)	1770	1731		1770	1856		1770	1691			1634	
Volume (vph)	30	364	324	50	402	10	325	50	80	10	30	50
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	383	341	53	423	11	342	53	84	11	32	53
RTOR Reduction (vph)	0	30	0	0	1	0	0	56	0	0	48	0
Lane Group Flow (vph)	32	694	0	53	433	0	342	81	0	0	48	0
Turn Type	Prot			Prot			Prot			Perm		
Protected Phases	5	2		1	6		3	8			4	
Permitted Phases										4		
Actuated Green, G (s)	4.9	46.6		6.7	48.4		20.3	33.2			8.4	
Effective Green, g (s)	5.4	47.1		7.2	48.9		20.8	33.7			8.9	
Actuated g/C Ratio	0.05	0.47		0.07	0.49		0.21	0.34			0.09	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	96	815		127	908		368	570			145	
v/s Ratio Prot	0.02	c0.40		c0.03	0.23		c0.19	0.05				
v/s Ratio Perm											c0.03	
v/c Ratio	0.33	0.85		0.42	0.48		0.93	0.14			0.33	
Uniform Delay, d1	45.6	23.4		44.4	17.0		38.9	23.1			42.7	
Progression Factor	1.32	0.66		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	2.0	10.8		2.2	1.8		29.2	0.1			1.3	
Delay (s)	62.1	26.2		46.6	18.8		68.1	23.2			44.1	
Level of Service	E	C		D	B		E	C			D	
Approach Delay (s)		27.8			21.8			55.3			44.1	
Approach LOS		C			C			E			D	

Intersection Summary			
HCM Average Control Delay	34.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis 2030 PM & Proj no Ramps MITIGATION
11: Main Street & Bridgehead Road 12/18/2006

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑↱		↰	↑↑↑	↱	↰	↰↑↱		↰↰	↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		1.00	0.91	1.00	0.91	0.91		0.97	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	0.99		0.95	1.00	1.00
Satd. Flow (prot)	1719	4820		1719	4940	1538	1564	3163		3335	1810	1538
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	0.99		0.95	1.00	1.00
Satd. Flow (perm)	1719	4820		1719	4940	1538	1564	3163		3335	1810	1538
Volume (vph)	164	2217	430	120	1497	194	260	290	100	253	181	228
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	173	2334	453	126	1576	204	274	305	105	266	191	240
RTOR Reduction (vph)	0	22	0	0	0	101	0	19	0	0	0	214
Lane Group Flow (vph)	173	2765	0	126	1576	103	220	445	0	266	191	26
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot			Prot		Perm	Split			Split		Prot
Protected Phases	5	2		1	6		8	8		7	7	7
Permitted Phases						6						
Actuated Green, G (s)	16.6	71.0		10.0	64.4	64.4	18.0	18.0		14.0	14.0	14.0
Effective Green, g (s)	16.6	72.0		10.0	65.4	65.4	18.0	18.0		14.0	14.0	14.0
Actuated g/C Ratio	0.13	0.55		0.08	0.50	0.50	0.14	0.14		0.11	0.11	0.11
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	220	2670		132	2485	774	217	438		359	195	166
v/s Ratio Prot	0.10	c0.57		c0.07	0.32		0.14	c0.14		0.08	c0.11	0.02
v/s Ratio Perm						0.07						
v/c Ratio	0.79	1.04		0.95	0.63	0.13	1.01	1.02		0.74	0.98	0.16
Uniform Delay, d1	55.0	29.0		59.8	23.6	17.2	56.0	56.0		56.2	57.9	52.6
Progression Factor	1.01	0.87		0.60	0.22	0.03	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.8	20.3		54.1	0.9	0.3	64.7	47.1		7.0	57.6	0.2
Delay (s)	60.6	45.5		89.8	6.0	0.8	120.7	103.1		63.3	115.5	52.8
Level of Service	E	D		F	A	A	F	F		E	F	D
Approach Delay (s)		46.4			11.0			108.8			74.0	
Approach LOS		D			B			F			E	

Intersection Summary			
HCM Average Control Delay	45.5	HCM Level of Service	D
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	94.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

13: Main Street & Live Oak Ave

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑↑	↱	↰	↑↑↱		↰	↑↱		↰↰	↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91		1.00	0.95		0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	4940	1538	1719	4810		1719	3338		3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	4940	1538	1719	4810		1719	3338		3433	3539	1583
Volume (vph)	292	2054	271	137	1417	389	218	453	214	458	641	184
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	307	2162	285	144	1492	409	229	477	225	482	675	194
RTOR Reduction (vph)	0	0	74	0	38	0	0	43	0	0	0	152
Lane Group Flow (vph)	307	2162	211	144	1863	0	229	659	0	482	675	42
Heavy Vehicles (%)	2%	5%	5%	5%	5%	2%	5%	2%	5%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2									4
Actuated Green, G (s)	12.0	58.0	58.0	11.0	57.0		18.5	26.0		19.0	26.5	26.5
Effective Green, g (s)	12.0	58.0	58.0	11.0	57.0		18.5	26.0		19.0	26.5	26.5
Actuated g/C Ratio	0.09	0.45	0.45	0.08	0.44		0.14	0.20		0.15	0.20	0.20
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	317	2204	686	145	2109		245	668		502	721	323
v/s Ratio Prot	0.09	c0.44		0.08	c0.39		0.13	c0.20		c0.14	0.19	
v/s Ratio Perm			0.14									0.03
v/c Ratio	0.97	0.98	0.31	0.99	0.88		0.93	0.99		0.96	0.94	0.13
Uniform Delay, d1	58.8	35.5	23.1	59.5	33.5		55.2	51.8		55.1	50.9	42.3
Progression Factor	0.77	0.63	0.25	0.94	0.57		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	33.8	12.2	0.8	67.9	5.2		39.7	31.1		30.2	19.4	0.2
Delay (s)	79.3	34.6	6.5	123.7	24.4		94.9	82.9		85.3	70.3	42.5
Level of Service	E	C	A	F	C		F	F		F	E	D
Approach Delay (s)		36.6			31.4			85.8			71.7	
Approach LOS		D			C			F			E	

Intersection Summary			
HCM Average Control Delay	48.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	93.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

15: Oakley Road & Neroly Road

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.92		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1738		1770	1721		1770	1848		1770	1851	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1738		1770	1721		1770	1848		1770	1851	
Volume (vph)	30	174	140	20	104	107	60	364	20	177	464	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	183	147	21	109	113	63	383	21	186	488	21
RTOR Reduction (vph)	0	50	0	0	66	0	0	3	0	0	2	0
Lane Group Flow (vph)	32	280	0	21	156	0	63	401	0	186	507	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	1.3	12.4		0.6	11.7		2.1	16.1		7.3	21.3	
Effective Green, g (s)	1.3	12.4		0.6	11.7		2.1	16.1		7.3	21.3	
Actuated g/C Ratio	0.02	0.24		0.01	0.22		0.04	0.31		0.14	0.41	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	44	411		20	384		71	568		247	752	
v/s Ratio Prot	c0.02	c0.16		0.01	0.09		0.04	0.22		c0.11	c0.27	
v/s Ratio Perm												
v/c Ratio	0.73	0.68		1.05	0.41		0.89	0.71		0.75	0.67	
Uniform Delay, d1	25.4	18.2		25.9	17.4		25.0	16.1		21.7	12.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	45.3	4.6		217.8	0.7		68.6	4.0		12.2	2.4	
Delay (s)	70.6	22.8		243.7	18.1		93.6	20.0		33.9	15.1	
Level of Service	E	C		F	B		F	C		C	B	
Approach Delay (s)		27.0			37.6			30.0			20.1	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM Average Control Delay	26.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	52.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

16: Oakley Road & Live Oak Ave

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↑	↱	↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1836		1770	1863	1583	1770	1835		1770	1848	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1836		1770	1863	1583	1770	1835		1770	1848	
Volume (vph)	47	290	30	60	210	249	50	549	60	310	661	38
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	49	305	32	63	221	262	53	578	63	326	696	40
RTOR Reduction (vph)	0	4	0	0	0	210	0	4	0	0	2	0
Lane Group Flow (vph)	49	333	0	63	221	52	53	637	0	326	734	0
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	3.0	17.0		3.0	17.0	17.0	3.0	32.2		17.1	46.3	
Effective Green, g (s)	3.0	17.0		3.0	17.0	17.0	3.0	32.2		17.1	46.3	
Actuated g/C Ratio	0.04	0.20		0.04	0.20	0.20	0.04	0.38		0.20	0.54	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	62	366		62	371	315	62	693		355	1003	
v/s Ratio Prot	0.03	c0.18		c0.04	0.12		0.03	c0.35		c0.18	0.40	
v/s Ratio Perm						0.03						
v/c Ratio	0.79	0.91		1.02	0.60	0.17	0.85	0.92		0.92	0.73	
Uniform Delay, d1	40.8	33.4		41.1	31.0	28.3	40.9	25.3		33.4	14.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	48.2	25.6		118.9	2.6	0.2	65.1	17.1		27.8	2.8	
Delay (s)	89.1	59.0		160.1	33.6	28.5	106.0	42.4		61.2	17.6	
Level of Service	F	E		F	C	C	F	D		E	B	
Approach Delay (s)		62.8			45.8			47.3			31.0	
Approach LOS		E			D			D			C	

Intersection Summary			
HCM Average Control Delay	42.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	85.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	83.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

17: Oakley Road & Empire Avenue

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↱		↰	↱	↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.99		1.00	0.97	
Flt Protected	0.95	0.97	1.00		0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1681	1716	1583		1807	1583	1770	3518		1770	3444	
Flt Permitted	0.95	0.97	1.00		0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1681	1716	1583		1807	1583	1770	3518		1770	3444	
Volume (vph)	250	60	380	80	50	80	389	720	30	150	688	150
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	263	63	400	84	53	84	409	758	32	158	724	158
RTOR Reduction (vph)	0	0	350	0	0	74	0	2	0	0	13	0
Lane Group Flow (vph)	159	167	50	0	137	10	409	788	0	158	869	0
Turn Type	Split		Perm	Split		Perm	Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	16.1	16.1	16.1		14.6	14.6	36.0	64.4		15.9	44.3	
Effective Green, g (s)	16.1	16.1	16.1		15.6	15.6	37.0	65.4		16.9	45.3	
Actuated g/C Ratio	0.12	0.12	0.12		0.12	0.12	0.28	0.50		0.13	0.35	
Clearance Time (s)	4.0	4.0	4.0		5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	208	213	196		217	190	504	1770		230	1200	
v/s Ratio Prot	0.09	c0.10			c0.08		c0.23	0.22		0.09	c0.25	
v/s Ratio Perm			0.03			0.01						
v/c Ratio	0.76	0.78	0.25		0.63	0.05	0.81	0.45		0.69	0.72	
Uniform Delay, d1	55.1	55.3	51.5		54.5	50.7	43.3	20.7		54.0	36.9	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.32	0.68	
Incremental Delay, d2	15.3	17.0	0.7		5.9	0.1	9.6	0.8		5.5	2.5	
Delay (s)	70.4	72.3	52.2		60.3	50.8	52.9	21.5		76.9	27.5	
Level of Service	E	E	D		E	D	D	C		E	C	
Approach Delay (s)		60.8			56.7			32.2			35.0	
Approach LOS		E			E			C			D	

Intersection Summary			
HCM Average Control Delay	41.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — 2030 PM & Proj no Ramps MITIGATION
18: Main Street & Empire Avenue — 11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰↰	↑↱		↰↰	↑	↱		↰↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.97	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.97	1.00
Satd. Flow (prot)	1719	3539	1538	3433	3530		3335	1810	1583		1787	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.97	1.00
Satd. Flow (perm)	1719	3539	1538	3433	3530		3335	1810	1583		1787	1538
Volume (vph)	40	1859	578	390	1173	20	590	40	420	30	20	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	1957	608	411	1235	21	621	42	442	32	21	32
RTOR Reduction (vph)	0	0	29	0	1	0	0	0	16	0	0	31
Lane Group Flow (vph)	42	1957	579	411	1255	0	621	42	426	0	53	1
Heavy Vehicles (%)	5%	2%	5%	2%	2%	2%	5%	5%	2%	2%	5%	5%
Turn Type	Prot		pm+ov	Prot			Split		pm+ov	Split		Perm
Protected Phases	7	4	2	3	8		2	2	3	6	6	
Permitted Phases			4						2			6
Actuated Green, G (s)	6.2	69.0	92.2	15.8	78.6		23.2	23.2	39.0		4.0	4.0
Effective Green, g (s)	6.2	70.0	94.2	15.8	79.6		24.2	24.2	40.0		4.0	4.0
Actuated g/C Ratio	0.05	0.54	0.72	0.12	0.61		0.19	0.19	0.31		0.03	0.03
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	82	1906	1114	417	2161		621	337	536		55	47
v/s Ratio Prot	0.02	c0.55	0.10	c0.12	0.36		c0.19	0.02	0.10		c0.03	
v/s Ratio Perm			0.28						0.17			0.00
v/c Ratio	0.51	1.03	0.52	0.99	0.58		1.00	0.12	0.79		0.96	0.02
Uniform Delay, d1	60.4	30.0	7.9	57.0	15.2		52.9	44.1	41.2		62.9	61.1
Progression Factor	1.08	0.99	1.48	1.00	1.00		0.86	0.78	0.79		1.00	1.00
Incremental Delay, d2	1.8	19.4	0.1	39.9	0.4		34.0	0.7	7.1		107.4	0.2
Delay (s)	67.0	49.0	11.8	96.9	15.6		79.2	35.0	39.6		170.3	61.3
Level of Service	E	D	B	F	B		E	D	D		F	E
Approach Delay (s)		40.6			35.6			61.7			129.3	
Approach LOS		D			D			E			F	

Intersection Summary			
HCM Average Control Delay	44.7	HCM Level of Service	D
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	96.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — 2030 PM & Proj no Ramps MITIGATION
23: Neroly Road & Live Oak Ave — 11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↱		↰	↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.92		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3329		1770	3270		1770	1813		1770	1835	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3329		1770	3270		1770	1813		1770	1835	
Volume (vph)	20	387	254	150	387	399	114	274	60	361	275	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	407	267	158	407	420	120	288	63	380	289	32
RTOR Reduction (vph)	0	119	0	0	175	0	0	8	0	0	4	0
Lane Group Flow (vph)	21	555	0	158	652	0	120	343	0	380	317	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	2.9	19.3		12.3	28.7		8.6	21.0		19.9	32.3	
Effective Green, g (s)	2.9	19.3		12.3	28.7		8.6	21.0		19.9	32.3	
Actuated g/C Ratio	0.03	0.22		0.14	0.32		0.10	0.24		0.22	0.36	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	58	726		246	1060		172	430		398	670	
v/s Ratio Prot	0.01	c0.17		c0.09	0.20		0.07	c0.19		c0.21	0.17	
v/s Ratio Perm												
v/c Ratio	0.36	0.76		0.64	0.62		0.70	0.80		0.95	0.47	
Uniform Delay, d1	41.9	32.5		36.0	25.2		38.7	31.7		33.9	21.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.8	4.8		5.6	1.1		11.7	14.2		33.3	2.4	
Delay (s)	45.7	37.3		41.7	26.3		50.3	45.9		67.2	24.0	
Level of Service	D	D		D	C		D	D		E	C	
Approach Delay (s)		37.5			28.8			47.1			47.4	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM Average Control Delay	38.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	88.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — 2030 PM & Proj no Ramps MITIGATION
25: Laurel Road & Empire Avenue — 11/6/2006

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	550	1517	310	110	1067	122	160	545	120	182	486	400
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	579	1597	326	116	1123	128	168	574	126	192	512	421
RTOR Reduction (vph)	0	0	138	0	0	78	0	0	102	0	0	28
Lane Group Flow (vph)	579	1597	188	116	1123	50	168	574	24	192	512	393
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		pm+ov
Protected Phases	7	4		3	8		5	2		1	6	7
Permitted Phases			4			8			2			6
Actuated Green, G (s)	20.0	51.0	51.0	8.0	39.0	39.0	11.9	20.8	20.8	13.0	21.9	41.9
Effective Green, g (s)	20.0	51.0	51.0	8.0	39.0	39.0	11.9	20.8	20.8	13.0	21.9	41.9
Actuated g/C Ratio	0.18	0.47	0.47	0.07	0.36	0.36	0.11	0.19	0.19	0.12	0.20	0.39
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	631	1659	742	130	1269	567	194	677	303	211	712	668
v/s Ratio Prot	c0.17	c0.45		0.07	0.32		0.09	c0.16		c0.11	0.14	0.11
v/s Ratio Perm			0.12			0.03			0.02			0.14
v/c Ratio	0.92	0.96	0.25	0.89	0.88	0.09	0.87	0.85	0.08	0.91	0.72	0.59
Uniform Delay, d1	43.6	28.0	17.4	50.0	32.8	23.1	47.7	42.5	36.1	47.3	40.6	26.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	18.2	14.2	0.2	47.7	7.7	0.1	30.8	9.7	0.1	37.6	3.5	1.3
Delay (s)	61.8	42.2	17.6	97.6	40.5	23.2	78.5	52.1	36.3	84.9	44.1	27.9
Level of Service	E	D	B	F	D	C	E	D	D	F	D	C
Approach Delay (s)		43.5			43.7			54.9			45.0	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	45.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	108.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 With Project NO RAMPS MITIGATION                12/18/06
========================================================================
INTERSECTION     3 SR 160 SB Ramps/Wilbur            Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------           100    0  293
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT     0 ---  0.0   1.0  0.0  1.0   0.0 ---    0  RIGHT
                                                          STREET NAME:
THRU   694 ---> 1.1  (NO. OF LANES)   2.0<---  494  THRU  Wilbur

RIGHT  200 ---  1.1   0.0  0.0  0.0   1.0 ---  110  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                   0    0    0                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 SB Ramps
========================================================================
               ORIGINAL   ADJUSTED               V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
SB  RIGHT (R)     100        100       1720     0.0581
    LEFT (L)      293        293       1720     0.1703     0.1703
------------------------------------------------------------------------
EB  RIGHT (R)     200        200       1720     0.1163
    THRU (T)      694        694       1720     0.4035
    T + R                    894       1720     0.5198     0.5198
------------------------------------------------------------------------
WB  THRU (T)      494        494       3440     0.1436
    LEFT (L)      110        110       1720     0.0640     0.0640
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                             0.75
     INTERSECTION LEVEL OF SERVICE:                                 C
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 With Project NO RAMPS MITIGATION                12/18/06
========================================================================
INTERSECTION     4 SR 160 NB Ramps/Wilbur            Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       3-PHASE SIGNAL
-----------             0    0    0
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   350 ---  1.0   0.0  0.0  0.0   1.1 ---  222  RIGHT
                                                          STREET NAME:
THRU   637 ---> 2.0  (NO. OF LANES)   2.1<---  554  THRU  Wilbur

RIGHT    0 ---  0.0   1.0  0.0  1.0   0.0 ---    0  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  50    0   80                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: SR 160 NB Ramps
========================================================================
               ORIGINAL   ADJUSTED               V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      80         80       1720     0.0465     0.0465
    LEFT (L)       50         50       1720     0.0291
------------------------------------------------------------------------
EB  THRU (T)      637        637       3440     0.1852
    LEFT (L)      350        350       1720     0.2035     0.2035
------------------------------------------------------------------------
WB  RIGHT (R)     222        222       1720     0.1291
    THRU (T)      554        554       3440     0.1610
    T + R                    776       3440     0.2256     0.2256
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                             0.48
     INTERSECTION LEVEL OF SERVICE:                                 A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 With Project NO RAMPS MITIGATION                12/18/06
========================================================================
INTERSECTION     5 Bridgehead/Wilbur                 Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       5-PHASE SIGNAL
-----------            50   30   10
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    30 ---  1.0   1.1  1.1  1.1   1.1 ---   10  RIGHT
                                                          STREET NAME:
THRU   364 ---> 1.1  (NO. OF LANES)   1.1<---  402  THRU  Wilbur

RIGHT  324 ---  1.1   1.0  1.1  1.1   1.0 ---   50  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 325   50   80                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Bridgehead
========================================================================
               ORIGINAL   ADJUSTED               V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      80         80       1650     0.0485
    THRU (T)       50         50       1650     0.0303
    LEFT (L)      325        325       1650     0.1970     0.1970
    T + R                    130       1650     0.0788
------------------------------------------------------------------------
SB  RIGHT (R)      50         50       1650     0.0303
    THRU (T)       30         30       1650     0.0182
    LEFT (L)       10         10       1650     0.0061
    T + R                     80       1650     0.0485
    T + L                     40       1650     0.0242
    T + R + L                 90       1650     0.0545     0.0545
------------------------------------------------------------------------
EB  RIGHT (R)     324        324       1650     0.1964
    THRU (T)      364        364       1650     0.2206
    LEFT (L)       30         30       1650     0.0182
    T + R                    688       1650     0.4170     0.4170
------------------------------------------------------------------------
WB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      402        402       1650     0.2436
    LEFT (L)       50         50       1650     0.0303     0.0303
    T + R                    412       1650     0.2497
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                             0.70
     INTERSECTION LEVEL OF SERVICE:                                 B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 With Project NO RAMPS MITIGATION                12/18/06
========================================================================
INTERSECTION    11 Bridgehead/Main                   Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------           228  181  253
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   164 ---  1.0   1.0  1.0  2.0   1.0 ---  194  RIGHT
                                                          STREET NAME:
THRU  2217 ---> 3.1  (NO. OF LANES)   3.0<--- 1497  THRU  Main

RIGHT  430 ---  1.1   2.1  2.2  1.1   1.0 ---  120  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 260  290  100                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Bridgehead
========================================================================
               ORIGINAL   ADJUSTED               V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     100        100       1650     0.0606
    THRU (T)      290        290       3300     0.0879
    LEFT (L)      260        260       3000     0.0867
    T + R                    390       3300     0.1182
    T + L                    550       4650     0.1183
    T + R + L                650       4650     0.1398     0.1398
------------------------------------------------------------------------
SB  RIGHT (R)     228         64 *     1650     0.0388
    THRU (T)      181        181       1650     0.1097     0.1097
    LEFT (L)      253        253       3000     0.0843
------------------------------------------------------------------------
EB  RIGHT (R)     430        430       1650     0.2606
    THRU (T)     2217       2217       4950     0.4479
    LEFT (L)      164        164       1650     0.0994
    T + R                   2647       4950     0.5347     0.5347
------------------------------------------------------------------------
WB  RIGHT (R)     194         55 *     1650     0.0333
    THRU (T)     1497       1497       4950     0.3024
    LEFT (L)      120        120       1650     0.0727     0.0727
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                             0.86
     INTERSECTION LEVEL OF SERVICE:                                 D
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 With Project NO RAMPS MITIGATION                12/18/06
========================================================================
INTERSECTION    13 Live Oak/Main Street              Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------           184  641  458
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   292 ---  2.0   1.0  2.0  2.0   1.1 ---  389  RIGHT
                                                          STREET NAME:
THRU  2054 ---> 3.0  (NO. OF LANES)   3.1<--- 1417  THRU  Main Street

RIGHT  271 ---  1.0   1.0  2.1  1.1   1.0 ---  137  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 218  453  214                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     214         214       1650     0.1297
    THRU (T)      453         453       3300     0.1373
    LEFT (L)      218         218       1650     0.1321
    T + R                     667       3300     0.2021     0.2021
------------------------------------------------------------------------
SB  RIGHT (R)     184          23 *     1650     0.0139
    THRU (T)      641         641       3300     0.1942
    LEFT (L)      458         458       3000     0.1527     0.1527
------------------------------------------------------------------------
EB  RIGHT (R)     271          53 *     1650     0.0321
    THRU (T)     2054        2054       4950     0.4149     0.4149
    LEFT (L)      292         292       3000     0.0973
------------------------------------------------------------------------
WB  RIGHT (R)     389         389       1650     0.2358
    THRU (T)     1417        1417       4950     0.2863
    LEFT (L)      137         137       1650     0.0830     0.0830
    T + R                    1806       4950     0.3648
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.85
     INTERSECTION LEVEL OF SERVICE:                             D
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 With Project NO RAMPS MITIGATION                12/18/06
========================================================================
INTERSECTION    15 Neroly/Oakley                     Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            20  464  177
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    30 ---  1.0   1.1  1.1  1.0   1.1 ---  107  RIGHT
                                                          STREET NAME:
THRU   174 ---> 1.1  (NO. OF LANES)   1.1<---  104  THRU  Oakley

RIGHT  140 ---  1.1   1.0  1.1  1.1   1.0 ---   20  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  60  364   20                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Neroly
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      20          20       1650     0.0121
    THRU (T)      364         364       1650     0.2206
    LEFT (L)       60          60       1650     0.0364
    T + R                     384       1650     0.2327     0.2327
------------------------------------------------------------------------
SB  RIGHT (R)      20          20       1650     0.0121
    THRU (T)      464         464       1650     0.2812
    LEFT (L)      177         177       1650     0.1073     0.1073
    T + R                     484       1650     0.2933
------------------------------------------------------------------------
EB  RIGHT (R)     140         140       1650     0.0848
    THRU (T)      174         174       1650     0.1055
    LEFT (L)       30          30       1650     0.0182
    T + R                     314       1650     0.1903     0.1903
------------------------------------------------------------------------
WB  RIGHT (R)     107         107       1650     0.0648
    THRU (T)      104         104       1650     0.0630
    LEFT (L)       20          20       1650     0.0121     0.0121
    T + R                     211       1650     0.1279
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.54
     INTERSECTION LEVEL OF SERVICE:                             A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 With Project NO RAMPS MITIGATION                12/18/06
========================================================================
INTERSECTION    16 Live Oak/Oakley                   Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            38  661  310
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    47 ---  1.0   1.1  1.1  1.0   1.0 ---  249  RIGHT
                                                          STREET NAME:
THRU   290 ---> 1.1  (NO. OF LANES)   1.0<---  210  THRU  Oakley

RIGHT   30 ---  1.1   1.0  1.1  1.1   1.0 ---   60  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                  50  549   60                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      60          60       1650     0.0364
    THRU (T)      549         549       1650     0.3327
    LEFT (L)       50          50       1650     0.0303
    T + R                     609       1650     0.3691     0.3691
------------------------------------------------------------------------
SB  RIGHT (R)      38          38       1650     0.0230
    THRU (T)      661         661       1650     0.4006
    LEFT (L)      310         310       1650     0.1879     0.1879
    T + R                     699       1650     0.4236
------------------------------------------------------------------------
EB  RIGHT (R)      30          30       1650     0.0182
    THRU (T)      290         290       1650     0.1758
    LEFT (L)       47          47       1650     0.0285
    T + R                     320       1650     0.1939     0.1939
------------------------------------------------------------------------
WB  RIGHT (R)     249           0 *     1650     0.0000
    THRU (T)      210         210       1650     0.1273
    LEFT (L)       60          60       1650     0.0364     0.0364
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.79
     INTERSECTION LEVEL OF SERVICE:                             C
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 With Project NO RAMPS MITIGATION                12/18/06
========================================================================
INTERSECTION    17 Empire/Oakley                     Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------           150  688  150
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? Y
LEFT   250 ---  2.1   1.1  2.1  1.0   1.0 ---   80  RIGHT
                                                          STREET NAME:
THRU    60 ---> 1.1  (NO. OF LANES)   1.1<---   50  THRU  Oakley

RIGHT  380 ---  1.0   1.0  2.1  1.1   1.1 ---   80  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 389  720   30                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      30          30       1650     0.0182
    THRU (T)      720         720       3300     0.2182
    LEFT (L)      389         389       1650     0.2358     0.2358
    T + R                     750       3300     0.2273
------------------------------------------------------------------------
SB  RIGHT (R)     150         150       1650     0.0909
    THRU (T)      688         688       3300     0.2085
    LEFT (L)      150         150       1650     0.0909
    T + R                     838       3300     0.2539     0.2539
------------------------------------------------------------------------
EB  RIGHT (R)     380           0 *     1650     0.0000
    THRU (T)       60          60       1650     0.0364
    LEFT (L)      250         250       3000     0.0833
    T + L                     310       3000     0.1033     0.1033
------------------------------------------------------------------------
WB  RIGHT (R)      80           0 *     1650     0.0000
    THRU (T)       50          50       1650     0.0303
    LEFT (L)       80          80       1650     0.0485
    T + L                     130       1650     0.0788     0.0788
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.67
     INTERSECTION LEVEL OF SERVICE:                             B
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 With Project NO RAMPS MITIGATION                12/18/06
========================================================================
INTERSECTION    18 Empire Avenue/Main Street         Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       6-PHASE SIGNAL
-----------            30   20   30
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    40 ---  1.0   1.0  1.1  1.1   1.1 ---   20  RIGHT
                                                          STREET NAME:
THRU  1859 ---> 2.0  (NO. OF LANES)   2.1<--- 1173  THRU  Main Street

RIGHT  578 ---  1.5   2.0  1.0  1.5   2.0 ---  390  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 590   40  420                         Urb=Y, Rur=Y
  S                   LEFT THRU RIGHT Split? Y

               STREET NAME: Empire Avenue
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     420        206 *     1650     0.1248
    THRU (T)       40         40       1650     0.0242
    LEFT (L)      590        590       3000     0.1967     0.1967
------------------------------------------------------------------------
SB  RIGHT (R)      30          0 *     1650     0.0000
    THRU (T)       20         20       1650     0.0121
    LEFT (L)       30         30       1650     0.0182
    T + L                     50       1650     0.0303     0.0303
------------------------------------------------------------------------
EB  RIGHT (R)     578        254 *     1650     0.1539
    THRU (T)     1859       1859       3300     0.5633     0.5633
    LEFT (L)       40         40       1650     0.0242
------------------------------------------------------------------------
WB  RIGHT (R)      20         20       1650     0.0121
    THRU (T)     1173       1173       3300     0.3555
    LEFT (L)      390        390       3000     0.1300     0.1300
    T + R                   1193       3300     0.3615
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.92
     INTERSECTION LEVEL OF SERVICE:                             E
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 With Project NO RAMPS MITIGATION                12/18/06
========================================================================
INTERSECTION    23 Live Oak/Neroly                   Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            30  275  361
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT    20 ---  1.0   1.1  1.1  1.0   1.1 ---  399  RIGHT
                                                          STREET NAME:
THRU   387 ---> 2.1  (NO. OF LANES)   2.1<---  387  THRU  Neroly

RIGHT  254 ---  1.1   1.0  1.1  1.1   1.0 ---  150  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 114  274   60                         Urb=Y, Rur=Y
  S                   LEFT THRU RIGHT Split? N

               STREET NAME: Live Oak
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      60         60       1650     0.0364
    THRU (T)      274        274       1650     0.1661
    LEFT (L)      114        114       1650     0.0691
    T + R                    334       1650     0.2024     0.2024
------------------------------------------------------------------------
SB  RIGHT (R)      30         30       1650     0.0182
    THRU (T)      275        275       1650     0.1667
    LEFT (L)      361        361       1650     0.2188     0.2188
    T + R                    305       1650     0.1848
------------------------------------------------------------------------
EB  RIGHT (R)     254        254       1650     0.1539
    THRU (T)      387        387       3300     0.1173
    LEFT (L)       20         20       1650     0.0121
    T + R                    641       3300     0.1942     0.1942
------------------------------------------------------------------------
WB  RIGHT (R)     399        399       1650     0.2418
    THRU (T)      387        387       3300     0.1173
    LEFT (L)      150        150       1650     0.0909     0.0909
    T + R                    786       3300     0.2382
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.71
     INTERSECTION LEVEL OF SERVICE:                             C
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: 2030 With Project NO RAMPS MITIGATION                12/18/06
========================================================================
INTERSECTION    25 Empire/Laurel                     Oakley
Count Date                   Time                Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------           400  486  182
                        |   |   |
             ^          |   |   |         ^
             |       <---   v   --->      | Split? N
LEFT   550 ---  2.0   1.0  2.0  1.0   1.0 ---  122  RIGHT
                                                          STREET NAME:
THRU  1517 ---> 2.0  (NO. OF LANES)   2.0<--- 1067  THRU  Laurel

RIGHT  310 ---  1.0   1.0  2.0  1.0   1.0 ---  110  LEFT
             |       <---   ^   --->      |
             v          |   |   |         v
  N                     |   |   |                         SIG WARRANTS:
W + E                 160  545  120                         Urb=Y, Rur=Y
  S                   LEFT THRU RIGHT Split? N

               STREET NAME: Empire
========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)     120         10 *     1650     0.0061
    THRU (T)      545        545       3300     0.1652     0.1652
    LEFT (L)      160        160       1650     0.0970
------------------------------------------------------------------------
SB  RIGHT (R)     400         98 *     1650     0.0594
    THRU (T)      486        486       3300     0.1473
    LEFT (L)      182        182       1650     0.1103     0.1103
------------------------------------------------------------------------
EB  RIGHT (R)     310        150 *     1650     0.0909
    THRU (T)     1517       1517       3300     0.4597     0.4597
    LEFT (L)      550        550       3000     0.1833
------------------------------------------------------------------------
WB  RIGHT (R)     122          0 *     1650     0.0000
    THRU (T)     1067       1067       3300     0.3233
    LEFT (L)      110        110       1650     0.0667     0.0667
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.80
     INTERSECTION LEVEL OF SERVICE:                             C
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=2030_WP.INT,VOL=2030_WP.PM,CAP=
```

APPENDIX C:
MODEL VALIDATION RESULTS

APPENDIX C - MODEL VALIDATION RESULTS

The CCTA Decennial Countywide Travel Demand Model is available in scenarios that represent years 2000, 2010, 2020, and 2030. In order to develop a model that closely reflects current conditions in the study area to serve as a baseline for future analysis, Fehr & Peers modified the CCTA Travel Demand Model to develop a year 2005 scenario. The roadway network for the 2005 scenario was based on the 2000 roadway network and modified to include roadway improvements within the City of Oakley and surrounding areas that have been completed since year 2000. The land use input data for the 2005 scenario was developed by interpolating between the model land uses for years 2000 and 2010. The 2005 land uses within the City of Oakley and the surrounding areas were further refined to reflect specific development projects that were constructed between 2000 and 2005.

As required by CCTA's *Technical Procedures*, a sub-area model validation exercise was conducted. The forecasted 2005 AM and PM peak hour volumes produced by the model were compared with counts collected in Oakley and northeast Antioch between 2004 and 2006. The model input parameters, such as roadway speeds, were further adjusted to better validate the baseline 2005 AM and PM peak hour scenarios.

Table C-1 summarizes the results of the validation test for the AM peak hour. The 2005 AM peak hour model satisfies five of the seven CCTA peak hour validation criteria. In comparison to the existing intersection counts, the 2005 AM peak hour model underestimates volumes by about 10 to 20 percent. The underestimation is across the study area and not in isolated areas. In addition, the underestimation would likely continue to occur in the future year model scenarios. The model results are not being used directly for analysis, but rather are "Furnessed." So, the underestimation in both the existing baseline and future forecasts are accounted for in the "Furness" process. As shown in Table C-2, the 2005 PM peak hour model satisfies all seven of the CCTA peak hour validation criteria.

TABLE C-1
CITY OF OAKLEY SUB-AREA MODEL VALIDATION RESULTS
AM PEAK HOUR

Validation Test	Number of Counts	Number Meeting Target	Percent Within Target	Validation Target	Is Target Met?
Arterials with 10,000+ Vehicles Within 30%	56	33	59%	75%	No
Arterials with 10,000+ Vehicles Within 15%	56	17	30%	50%	No
Intersections with 1,000+ veh/hr within 20% of Counts	17	10	59%	50%	Yes
Intersections with 500-1,000 veh/hr within 20% of Counts	11	8	73%	30%	Yes
All Intersections within 30% of Counts	29	23	79%	75%	Yes
All Intersections within 15% of Counts	29	15	52%	50%	Yes

Source: Fehr & Peers, 2006.

TABLE C-2
CITY OF OAKLEY SUB-AREA MODEL VALIDATION RESULTS
PM PEAK HOUR

Validation Test	Number of Counts	Number Meeting Target	Percent Within Target	Validation Target	Is Target Met?
Arterials with 10,000+ Vehicles Within 30%	56	48	86%	75%	Yes
Arterials with 10,000+ Vehicles Within 15%	56	33	59%	50%	Yes
Intersections with 1,000+ veh/hr within 20% of Counts	18	14	78%	50%	Yes
Intersections with 500-1,000 veh/hr within 20% of Counts	11	9	82%	30%	Yes
All Intersections within 30% of Counts	29	27	93%	75%	Yes
All Intersections within 15% of Counts	29	21	72%	50%	Yes

Source: Fehr & Peers, 2006.

APPENDIX D:
NEAR TERM APPROVED PROJECT LIST

Commercial

	Development	Project Location	Approval Date	Approved Sq. Footage	Approval Resolution	Bldg. Permits Pulled	Status
	Caffino	Main Street	6/28/2004	112	Reso. 17-04	submitted	Approved
	Wendy's	Main Street	6/20/2005	3,179	Reso. XX-05	no	Approved
	Pump it Up	Neroly Rd	9/27/2004	14,000	Reso. 23-04	6/16/05	Construction Completed
	Hardcastle RV & Storage Center	1189 Main St.	3/21/2005	5,321	Reso. 12-05	no	Approved
	Main Street Retail (Equus Group)	Main Street near Carol Lane	2/22/2005	10,740	Reso. 06-05	yes	Under Construction
	Les Schwab	89 Carol Lane	12/1/2003	16,800	Reso. 16-03	4/12/05	Construction Completed
	Smog and Repair Shop	5290 Neroly Road	7/19/2004	2,300	Reso. 19-04	submitted	Construction Completed
	T-Mobile Cell Tower	Empire Ave (behind Albertson's)		na			Application Received
	Paul's Automotive	5060 & 5090 Neroly Rd.	5/01/2006	10,125	PC Reso 13		Approved
	Oakley Village Light Industrial Park	259 Sandy Lane		231,765			Application Received
	Immanuel Baptist Church	2459 Laurel Rd.		19,218			Application Received
	Acme Street Remodel	150 E. Acme Street					Application Received
	Cal Trak Trailers	3873 Main St.					Application Received
	Pompeii Nursery	Almond Tree Lane & Main St.	3/21/2005	1,800	Reso. 14-05	submitted	Under Construction
	ARCO AM/PM	SW corner Hwy4/E. Cypress	5/16/2005	3,600	Reso. 19-05	submitted	Approved
	A-Secure Storage	4700 Main Street	1/20/2004	70,400	PC Reso 02	submitted	Approved
	S+S Retail Center	101 E. Cypress Road		14,700			Application Received
	Oak Leaf Center	100-104 Loren/Laurel/Main		27,000			Application Received
	Popeye's Restaurant and Retail Cente	900 to 912 Main Street	11/22/2004	6,000	Reso. 26-04	no	Approved
	Oakley Village Commercial Center	100 Carol/Main Street	6/19/2006	6,700			Approved
	Rasooly Industrial Complex	Live Oak Ave					Expired
	New Lifeline World Ministries	Hagar Ln & West Cypress Pl					Empire Ave & Meeks Rd. built a pkg lot
	Shoreline Park / Science Center	Big Break Rd N. of Vintage Pkwy					1st phase of the science center for pier and pkg lot by EBRPD
	Civic Center	Main St & Norcross Ln		15,000			Approved
	Bakery	Main St. - Between Hall St & Norcross Ln					Remodeled
	Safeway	NE corner Laurel/O'Hara	4/5/2004	85,000	Reso. 08-04	submitted	Approved
	Stevenson Mechanical	Seventh St					Remodel, appd.

Totals: **543,760**

Residential

Tentative Tract Number	Development	Project Location	Approval Date	Resolution Number	Approved Lots/Units	Bldg. Permits Pulled	Status
	Eagle City Expansion	2333 Main St.	7/18/2005		n/a		Approved
8725	Montevino - Richmond American	2200 Oakley Rd			48	48	Built Out
MS 04-978	Zel Debelich	140 Hill Ave	6/20/2005	PC 27-05	3	0	Approved
7599	Carpenter on Live Oak	4660 Live Oak Ave	March.2001		11	0	Approved
MS 01-978	Larry and Mary Pate	Neroly Rd			4	4	Built Out
7467/7235	Meritage	Live Oak Ave	6/4/2001		57	57	Built Out
MS 04-980	Beers Minor Subdivision	30 W. Cypress Place	6/27/2005		3		Approved
7426/7590	Monarch Ranch (Amberwood) - West	4400 Live Oak Ave	Feb. 1992		182	126	Approved
9044	Laurel - Discovery Builders	Laurel near Rose Ave.			20		Application Received
9027	Duarte Ranch - Heartwood Communiti	Southeast Corner Laurel/Rose	5/22/2006	CC 76-06	116		Approved
7359	Quail Glen - Discovery	4195 Live Oak Ave	Aug. 2002		36	35	Approved
8985	Clyde Miles Construction - Lois Lane	Lois Lane			11		Approved
8728	Calandev - Stewart Fahmy	Fuscia Ave	10/3/2005		30		Approved
8569	Habitat for Humanity	Norcross Lane	April. 2004		6	6	Built Out
8787	Rosewood Estates - Discovery Builder	Laurel Rd			60		Application Received
8916	Heartwood Estates	Mellowwood/Clearwood	7/11/2005	CC 69-05	41	0	Approved
8836	Vintner View - Discovery Builders	Grapevine Ln			16		Approved
8823	Beldin Lane 1 - Jeffrey Olson	Beldin and Oakley Rd.	3/28/2005	CC 28-05	6	0	Approved
8843	Beldin Lane 2 - Roy Griffin/Reggie Bar	Beldin Lane	3/28/2005	CC 29-05	13	0	Approved
MS 04-979		Oakley Rd & Live Oak Ave					withdrawn
MS 06-978		Knarlwood Rd & Poco Ln					application in for 4 lots, not appd
MS 02-976		Main St & Live Oak Ave			2		2 lots - Approved but no PM
MS 06-976		Stirrup Dr			2		application for 2 lots to be appd on 9/5/06
9030		Rose Ave & Laurel Ave			6		6 lots on the sw corner of Laurel and Main St.
9088		Knox Ln			40		Pre-app. for approx. 40 1/4 acre lots
MS 05-976		Laurel Rd - Between Live Oak Ave & Empire Ave			4		Approved
MS 03-979		Norcross Ln - Between W. Home St & Amador Ave			2		Approved
Totals:					**708**	**276**	

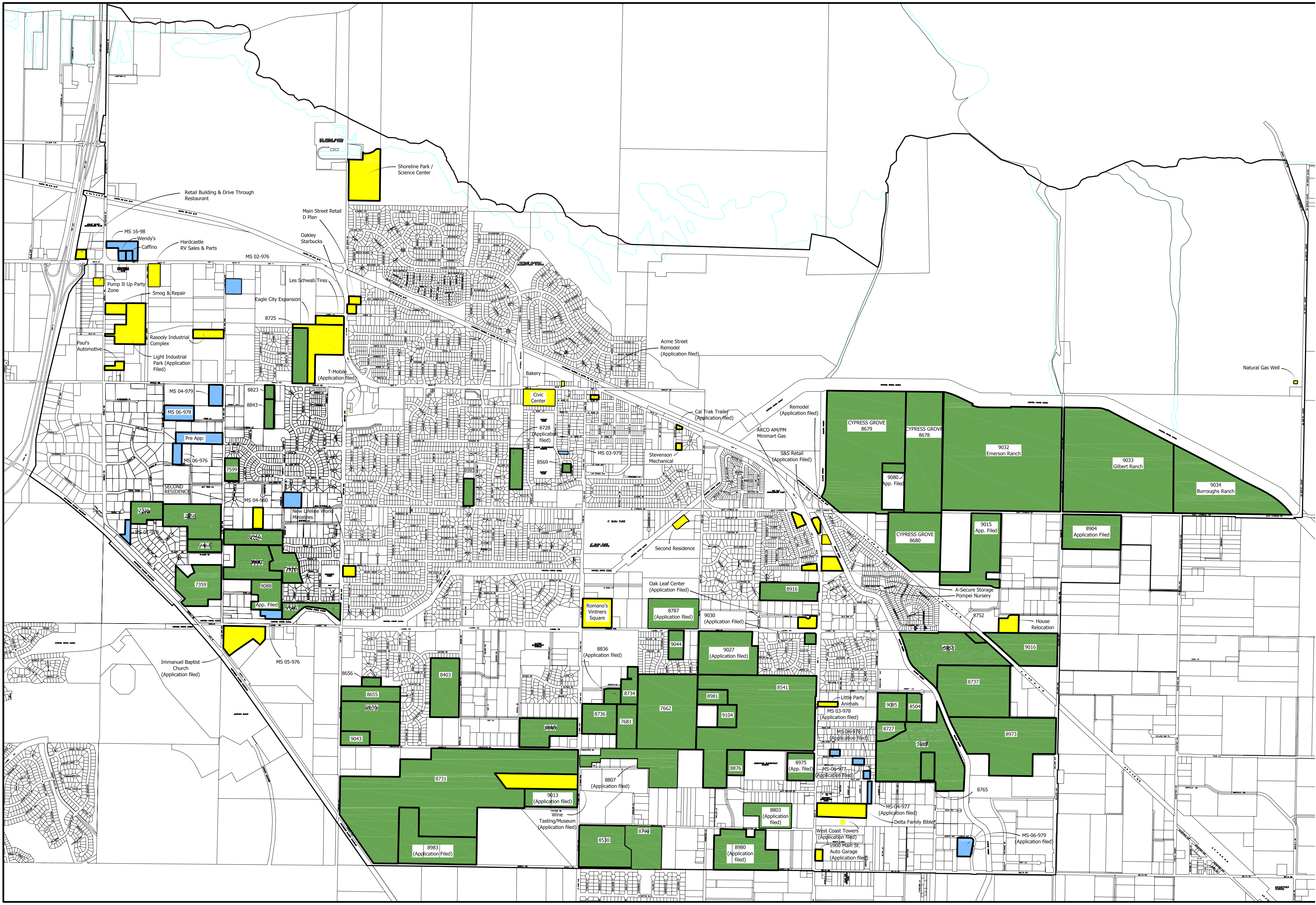

Natural Gas Well
9034 Burroughs Ranch
9033 Gilbert Ranch
9032 Emerson Ranch
CYPRESS GROVE 8679
CYPRESS GROVE 8678
9080 App. Filed
CYPRESS GROVE 8680
9015 App. Filed
8904 Application Filed
A-Secure Storage
Pompei Nursery
8752
House Relocation
9016
8737
8973
8765
MS-06-979 (Application filed)
8504
9085
8727
MS-04-977 (Application filed)
Delta Family Bible
West Coast Towers (Application filed)
5900 Main St. Auto Garage (Application filed)
Little Party Animals
MS 03-978 (Application filed)
MS-06-978 (Application filed)
MS-06-977 (Application filed)
8975 (App. filed)
8803 (Application filed)
8980 (Application filed)
8541
8981
9104
8876
8790
8530
8807 (Application filed)
9027 (Application filed)
9030 (Application Filed)
8916
8787 (Application filed)
Oak Leaf Center (Application Filed)
9044
7662
8734
7681
8736
8836 (Application filed)
Romano's Vintners Square
Second Residence
Remodel (Application filed)
ARCO AM/PM Minimart Gas
S&S Retail (Application Filed)
Cal Trak Trailer (Application filed)
Stevenson Mechanical
Acme Street Remodel (Application filed)
Civic Center
Bakery
8728 (Application filed)
8569
MS 03-979
8985
9013 (Application filed)
Wine Tasting/Museum (Application filed)
8731
8983 (Application Filed)
8403
8656
8655
9043
Shoreline Park / Science Center
Main Street Retail D Plan
Oakley Starbucks
Les Schwab Tires
Eagle City Expansion
8725
T-Mobile (Application filed)
MS 02-976
Retail Building & Drive Through Restaurant
MS 16-98
Wendy's
Caffino
Hardcastle RV Sales & Parts
Pump It Up Party Zone
Smog & Repair
Rasooly Industrial Complex
Light Industrial Park (Application Filed)
Paul's Automotive
MS 04-979
MS 06-978
Pre App.
MS 06-976
8823
8843
7599
SECOND RESIDENCE
MS 04-980
New Lifeline World Ministries
9088
App. Filed
7359
MS 05-976
Immanuel Baptist Church (Application filed)

TABLE 6

APPROVED AND PENDING DEVELOPMENTS IN PROJECT VICINITY

#[1]	Project	Location/City[2]	Size[3]	Status
1	2250 Senior Housing	Deer Valley Rd., S. of Lone Tree (A)	2250 DU	In process
2	150 Apartments	NW Corner of Lone Tree/Canada Valley (A)	150 DU	Under construction
3	Amber Park	S. of Lone Tree, E. of Empire (B)	162 DU	Under construction
4	Arbor Ridge Apartments	S. of Lone Tree, E. of Shady Willow (B)	178 DU	Under construction
5	Arcadia	Lone Tree, E. of Heidorn Ranch Rd. (B)	204 KSF	Under construction
6	Bixby/Laurel Ranch	N.& S. of Laurel Rd., W. of SR-4 Bypass (A)	217 DU 10 ac. Commercial	In process
7	Blue Rock	Lone Tree & Golf Course Road (A)	240 DU[4] 247 KSF Office	Approved
8	Blumen Ranch	N. of Lone Tree, W. of Main (B)	176 DU	Approved
9	Davidon Homes	Vista Grade, E. of Canada Valley (A)	579 DU[5]	In process
10	Deer Valley Business Park	Deer Valley Rd. & Country Hills (A)	82 KSF Office	Under construction
11	Empire Shopping Center	W. of Empire, N. of Lone Tree (A)	54 KSF Retail	Completed
12	Hidden Glen	Off Hillcrest, N. of Lone Tree (A)	371 DU	Under construction
13	Kaiser Hospital	Deer Valley Rd., S. of Lone Tree (A)	427 KSF Hospital 173 KSF Med Office	Under construction
14	Linda Budge - KFC/A&W	S. of Lone Tree, E. of Shady Willow (B)	21 KSF Restaurant	Approved
15	Lone Tree Landing Retail Center and Business Park	N. of Lone Tree, E. of Hillcrest (A)	40 KSF Retail[6] 91 KSF Office 21 KSF Health Club 9.4 KSF Restaurant	Under Construction
16	In Shape Shopping Center	Lone Tree, W. of Dallas Ranch Rd. (A)	10 KSF Office 14 KSF Restaurant 60 KSF Heath Club 101 KSF Retail	In process
17	Lowe's Home Improvement	NE Corner Lone Tree & Canada Valley (A)	171 KSF	Complete
18	Meadow Creek Crossing	Heidorn Ranch Rd., S. of Lone Tree (A)	437 DU	Under construction
19	Nelson Ranch Homes	S. of SR-4 (A)	354 DU	Approved
20	Rose Garden/Pulte Project	N. of Lone Tree, E. of UPRR (B)	471 DU	Under construction
21	Sand Creek Ranch	N. of Country Hills, W. of Canada Valley (A)	490 DU	Under construction
22	Shady Willow Plaza	S. of Lone Tree, E. of Shady Willow (B)	29 KSF Retail	Approved
23	Sterling Preserve II - Meritage Homes	S. of Lone Tree, E. of O'Hara (B)	77 DU	Under construction
24	Tri-City Plaza	SE of Lone Tree & Fairview (B)	51 KSF Retail	Under construction
25	Visions at Brentwood	SE of Lone Tree & Windy Springs (B)	142 DU	Under construction
26	WinCo Shopping Center	N. of Lone Tree, E. of Empire (B)	20 KSF Retail	Under construction
27	Williamson Ranch Plaza Phases III & IV	NS Lone Tree, W. of Indian Hill (A)	12 KSF Office 6 KSF Restaurant	Under construction
28	Capital and Counties	N. of Lone Tree, W. of Empire (A)	375 KSF Retail	Development App. Anticipated
29	Retail Center	NE Corner of Lone Tree & Empire (B)	11+ acres Retail	In process
30	Deer Valley Business Park	Deer Valley Rd. & Country Hills (A)	93 KSF Retail 58 KSF College	Pending/ Anticipated

[1] Numbers keyed to general project locations shown in Figure 10.

[2] (A) = Antioch; (B) = Brentwood.

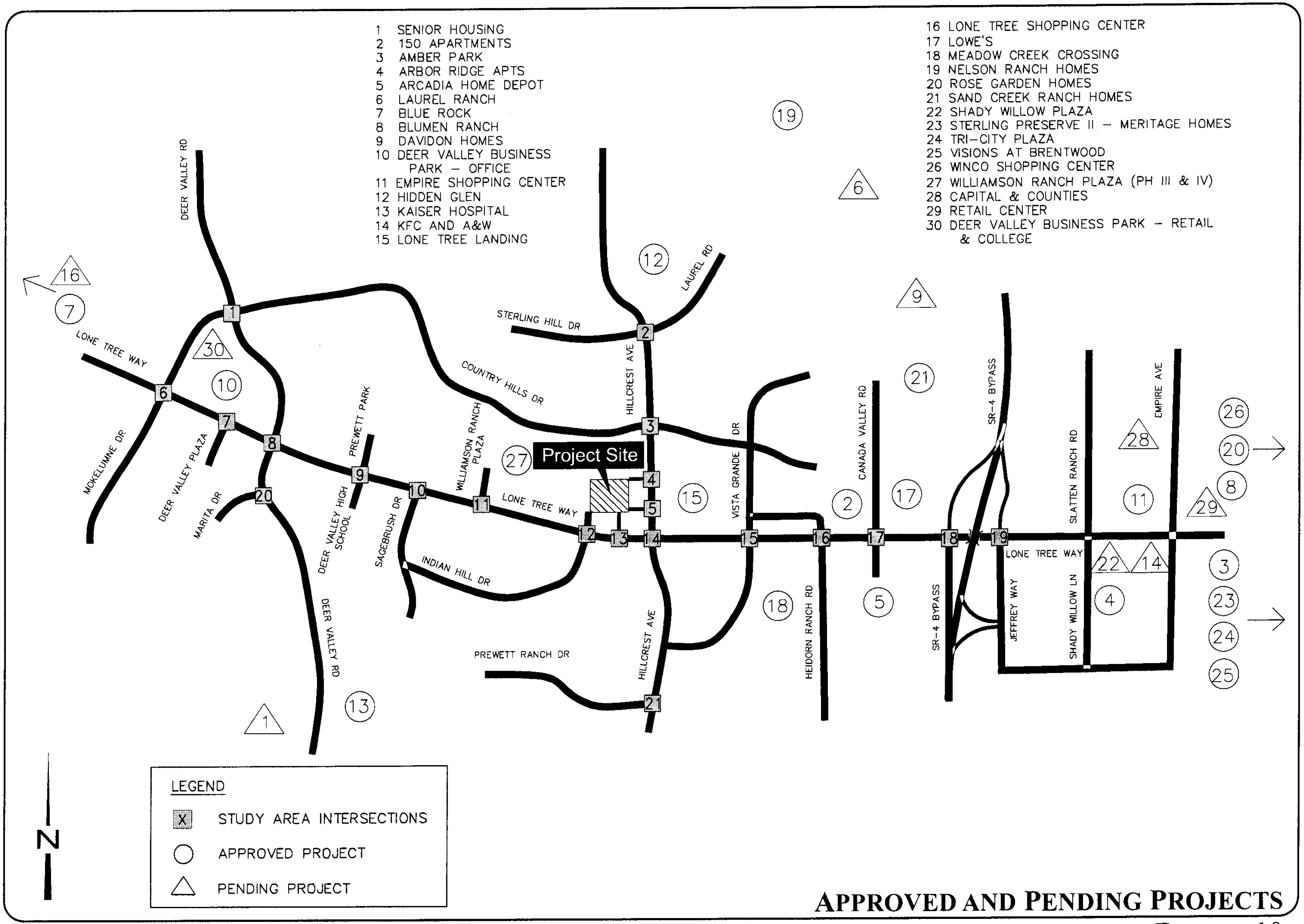
[3] DU = dwelling units; KSF = thousand square feet.

[4] Blue Rock has been reduced to 86 DU; the traffic analysis was based on the higher numbers in the table.

[5] Davidon Homes has been reduced to 538 DU; the traffic analysis was based on the higher number in the table.

[6] Lone Tree Landing has changed to 80.9 KSF of retail and 92 KSF of office, representing a reduction in net trip generation.

Source: Kimley-Horn and Associates



APPROVED AND PENDING PROJECTS

FIGURE 10

SOURCE: KIMLEY-HORN AND ASSOCIATES

APPENDIX E:
SUPPLEMENTAL CUMULATIVE ANALYSIS -
NO RAMPS BETWEEN SR 160 AND SR 4 BYPASS

APPENDIX E - SUPPLEMENTAL CUMULATIVE ANALYSIS - NO RAMPS BETWEEN SR 160 AND SR 4 BYPASS

The completion of the connector ramps between SR 4 Bypass and SR 160 is currently not fully funded. The results of a supplemental analysis without the completion of these ramps is presented in this appendix. The impacts and mitigations presented in this Appendix would be applicable instead of the ones presented in Chapter 5 if the connector ramps are not constructed. Analysis methods and assumptions are the same as the Cumulative Conditions analysis presented in Chapter 5, with the exception that the CCTA Decennial Countywide Travel Demand Model for the year 2030 was executed without these ramps. The Cumulative (2030) No Ramps No Project conditions AM and PM peak hour intersection volumes are presented on Figure E-1. In comparison to the Cumulative (2030) conditions intersection volumes presented on Figure 11, without the SR 160 – SR 4 Bypass connector ramps, more traffic would use other north-south corridors such as Empire Avenue, Live Oak Avenue, and Neroly Road/Bridgehead Road.

ANALYSIS OF CUMULATIVE NO RAMPS NO PROJECT CONDITIONS

The Cumulative (year 2030) No Ramps No Project conditions analysis was performed using the same methods previously discussed. Table E-1 summarizes the intersection LOS analysis results of the Cumulative No Project conditions. Appendix B contains the LOS calculation worksheets. In general, most study intersections operate at the same LOS regardless of the connector ramps. Some intersections would operate at a worse LOS due to the higher north-south traffic volumes. Based on the analysis, the following intersections would operate at unacceptable conditions under the Cumulative No Ramps No Project conditions. These intersections would operate at unacceptable conditions regardless of the connector ramps under the Cumulative No Project conditions:

#2 The stop-controlled northbound approach at the side-street stop-controlled Wilbur Avenue/Vierra Avenue intersection would operate at LOS E (delay = 41 seconds) during the PM peak hour. However, the intersection volumes would not satisfy the MUTCD peak hour signal warrant.

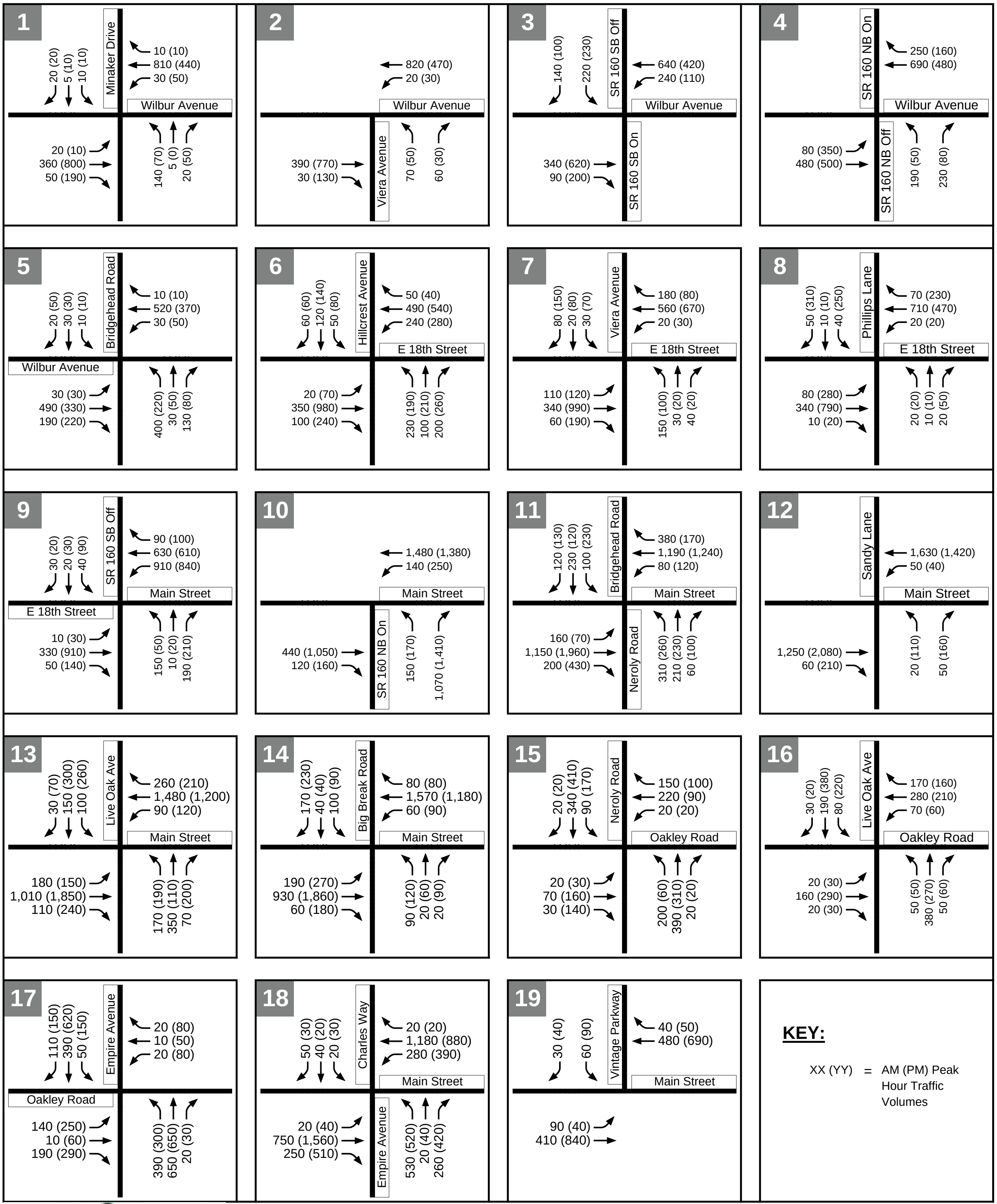
#3 The stop-controlled southbound approach at the side-street stop-controlled Wilbur Avenue/SR 160 southbound ramps intersection would operate at LOS F (delay > 60 seconds) during both AM and PM peak hour, and the intersection would satisfy the MUTCD peak hour signal warrant.

#4 The stop-controlled northbound approach at the side-street stop-controlled Wilbur Avenue/SR 160 northbound ramps intersection would operate at LOS F (delay > 60 seconds) during both AM and PM peak hour, and the intersection would satisfy the MUTCD peak hour signal warrant.

#5 The all-way stop-controlled Wilbur Avenue/Bridgehead Road intersection would operate at LOS F (delay > 60 seconds) during both AM and PM peak hours. The intersection would satisfy the MUTCD peak hour signal warrant.

#15 The all-way stop-controlled Oakley Road/Neroly Road intersection would operate at LOS F during both AM and PM peak hours (delay >60 seconds). The intersection would satisfy the MUTCD peak hour signal warrant.

#16 The all-way stop-controlled Oakley Road/Live Oak Avenue intersection would operate at LOS F (delay > 60 seconds) during both AM and PM peak hour and would satisfy the MUTCD peak hour signal warrant.



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CUMULATIVE (2030) NO RAMPS NO PROJECT PEAK HOUR INTERSECTION VOLUMES

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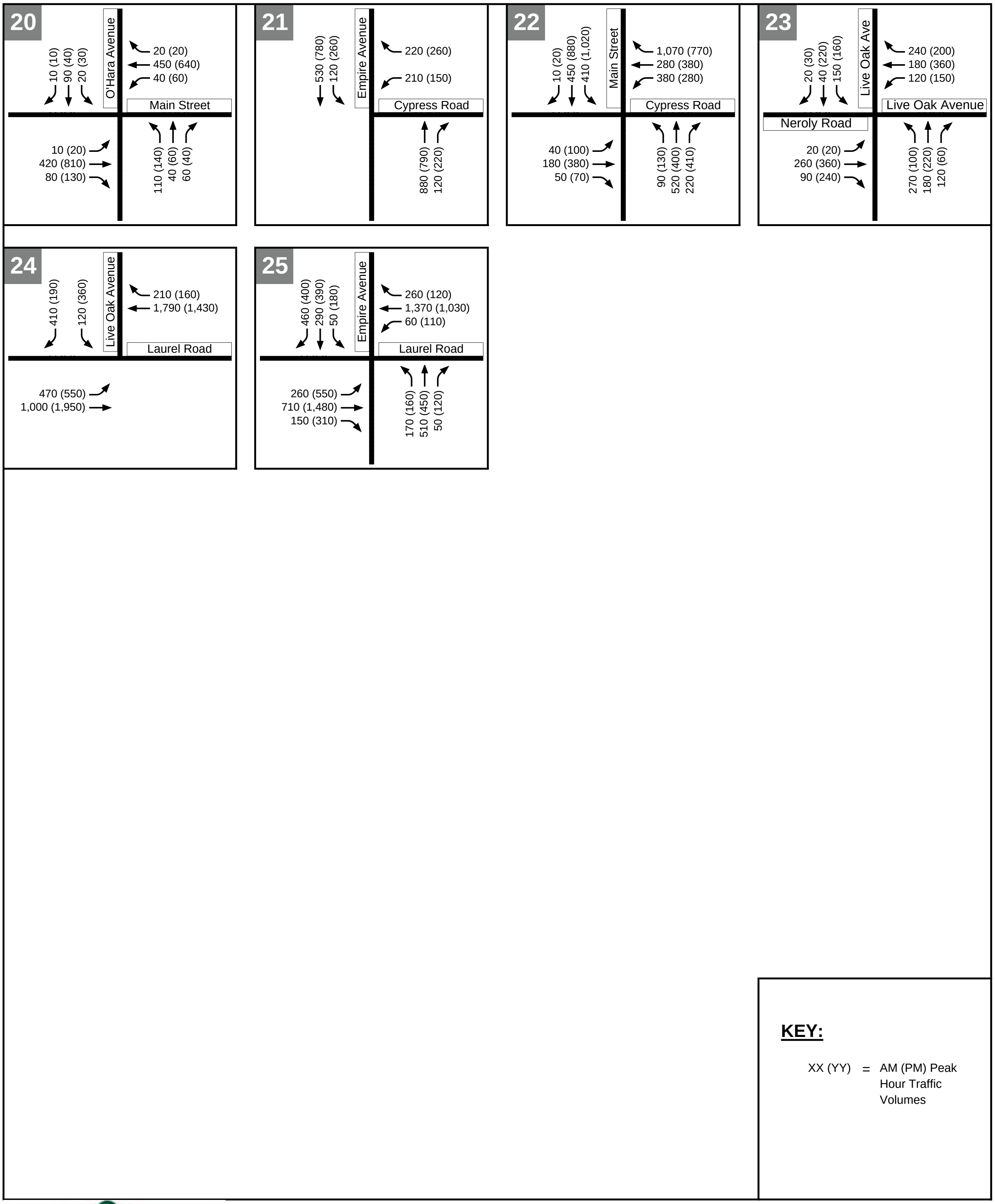
Figure E-1A



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CUMULATIVE (2030) NO RAMPS NO PROJECT PEAK HOUR INTERSECTION VOLUMES

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Figure E-1B

TABLE E-1
CUMULATIVE (2030) NO RAMPS WITH AND WITHOUT PROJECT CONDITIONS
INTERSECTION PEAK HOUR LOS SUMMARY

Intersection	Control[1]	Peak Hour	CUMULATIVE NO PROJECT				CUMULATIVE WITH PROJECT			
			CCTALOS		HCM		CCTALOS		HCM	
			V/C Ratio[2]	LOS	Delay[3]	LOS	V/C Ratio[2]	LOS	Delay[3]	LOS
1. Wilbur Avenue/Minaker Drive	Signal	AM	0.35	A	11	B	0.36	A	11	B
		PM	0.38	A	9	A	0.40	A	9	A
2. Wilbur Avenue/Viera Avenue	SSSC	AM	--	--	3 (35)	A (D)	--	--	4 (41)	A **(E)**
		PM	--	--	2 **(41)**	A **(E)**	--	--	4 (**59**)	A **(F)**
3. Wilbur Avenue/SR 160 SB Ramps	SSSC	AM	--	--	**>60 (>60)**	**F (F)**	--	--	**>60 (>60)**	**F (F)**
		PM	--	--	**>60 (>60)**	**F (F)**	--	--	**>60 (>60)**	**F (F)**
4. Wilbur Avenue/SR 160 NB Ramps	SSSC	AM	--	--	20 **(>60)**	C **(F)**	--	--	27 **(>60)**	D **(F)**
		PM	--	--	10 **(>60)**	A **(F)**	--	--	15 **(>60)**	B **(F)**
5. Wilbur Avenue/Bridgehead Road	AWSC	AM	--	--	**>60**	**F**	--	--	**>60**	**F**
		PM	--	--	**>60**	**F**	--	--	**>60**	**F**
6. East 18th Street/Hillcrest Avenue	Signal	AM	0.49	A	21	C	0.51	A	23	C
		PM	0.74	C	40	D	0.78	C	42	D
7. East 18th Street/Viera Avenue	Signal	AM	0.42	A	7	A	0.44	A	7	A
		PM	0.51	A	7	A	0.55	A	8	A
8. East 18th Avenue/Phillips Lane	Signal	AM	0.31	A	19	B	0.34	A	19	B
		PM	0.52	A	24	C	0.59	A	21	C
9. Main Street/SR 160 SB Ramps	Signal	AM	0.54	A	17	B	0.59	A	17	B
		PM	0.70	B	27	C	0.80	C	30	C
10. Main Street/SR 160 NB Ramps	Signal	AM	0.55	A	11	B	0.60	A	11	B
		PM	0.69	B	21	C	0.78	C	28	C
11. Main Street/Bridgehead Road/Neroly Road	Signal	AM	0.64	B	27	C	0.72	C	32	C
		PM	0.83	D	44	D	**0.95**	**E**	**62**	**E**
12. Main Street/Sandy Lane	Signal	AM	0.33	A	5	A	0.42	A	10	A
		PM	0.54	A	6	A	0.70	B	13	B
13. Main Street/Live Oak Avenue	Signal	AM	0.62	B	24	C	0.76	C	36	D
		PM	0.67	B	28	C	**0.92**	**E**	**64**	**E**
14. Main Street/Big Break Road	Signal	AM	0.73	C	21	C	0.80	C	22	C
		PM	0.77	C	25	C	0.89	D	34	C
15. Oakley Road/Neroly Road	AWSC	AM	--	--	**>60**	**F**	--	--	**>60**	**F**
		PM	--	--	**>60**	**F**	--	--	**>60**	**F**
16. Oakley Road/Live Oak Avenue	AWSC	AM	--	--	**>60**	**F**	--	--	**>60**	**F**
		PM	--	--	**>60**	**F**	--	--	**>60**	**F**

TABLE E-1
CUMULATIVE (2030) NO RAMPS WITH AND WITHOUT PROJECT CONDITIONS
INTERSECTION PEAK HOUR LOS SUMMARY

Intersection	Control[1]	Peak Hour	CUMULATIVE NO PROJECT				CUMULATIVE WITH PROJECT			
			CCTALOS		HCM		CCTALOS		HCM	
			V/C Ratio[2]	LOS	Delay[3]	LOS	V/C Ratio[2]	LOS	Delay[3]	LOS
17. Oakley Road/Empire Avenue	Signal	AM	0.54	A	22	C	0.58	A	23	C
		PM	0.74	C	45	D	0.83	D	53	D
18. Main Street/Empire Avenue	Signal	AM	0.60	A	26	C	0.65	B	28	C
		PM	**0.91**	**E**	**56**	**E**	**1.03**	**F**	**80**	**F**
19. Main Street/Vintage Parkway	Signal	AM	0.24	A	8	A	0.28	A	8	A
		PM	0.30	A	7	A	0.38	A	7	A
20. Main Street/O'Hara Avenue	Signal	AM	0.43	A	13	B	0.51	A	14	B
		PM	0.66	B	16	B	0.83	D	27	C
21. Cypress Road/Empire Avenue	Signal	AM	0.48	A	13	B	0.51	A	15	B
		PM	0.53	A	18	B	0.60	A	19	B
22. Cypress Road/Main Street	Signal	AM	0.69	B	32	C	0.73	C	42	D
		PM	0.77	C	50	D	0.84	D	53	D
23. Neroly Road/Live Oak Avenue	AWSC	AM	--	--	**>60**	**F**	--	--	**>60**	**F**
		PM	--	--	**>60**	**F**	--	--	**>60**	**F**
24. Laurel Road/Live Oak Avenue	Signal	AM	0.63	B	21	C	0.67	B	28	C
		PM	0.69	B	21	C	0.78	C	29	C
25. Laurel Road/Empire Avenue	Signal	AM	**1.03**	**F**	**75**	**E**	**1.04**	**F**	**80**	**E**
		PM	**1.02**	**F**	**95**	**F**	**1.06**	**F**	**>100**	**F**
26. Bridgehead Road/Project Driveway	N/A/Signal	AM	--	--	--	--	0.50	A	8	A
		PM	--	--	--	--	0.43	A	11	B
27. Main Street/Project Driveway Center	N/A/Signal	AM	--	--	--	--	0.39	A	2	A
		PM	--	--	--	--	0.58	A	9	A
28. Main Street/Project Driveway East	N/A/Signal	AM	--	--	--	--	0.42	A	2	A
		PM	--	--	--	--	0.57	A	5	A
29. Live Oak Avenue/Project Driveway	N/A/Signal	AM	--	--	--	--	0.41	A	10	A
		PM	--	--	--	--	0.80	C	38	D

Bold indicates intersection operating at deficient level of service.

1. Signal = Signalized intersection
   SSSC = Side-street stop-controlled intersection
   AWSC = All-way stop-controlled intersection
2. Volume-to-capacity ratio (V/C) determined for all signalized intersections using the CCTALOS methodology.
3. Average intersection delay is calculated for all signalized and unsignalized intersections using the 2000 *Highway Capacity Manual* (HCM) methods. For side-street stop-controlled intersections, average intersection delay (in seconds per vehicle) is presented. Delay for worst approach is shown in brackets.

Source: Fehr & Peers, 2006.

#25 The signalized Laurel Road/Empire Avenue intersection would operate at LOS F during both AM and PM peak hours (v/c = 1.03 and delay = 75 seconds during the AM peak hour and v/c = 1.02 and delay = 95 seconds during the PM peak hour).

The following intersections would operate at acceptable service levels under Cumulative With Ramps No Project conditions. However, they would operate at unacceptable service levels under Cumulative No Ramps No Project conditions:

#18 The signalized Main Street/Empire Avenue intersection would operate at an LOS E during the PM peak hour (v/c = 0.91 and delay = 56 seconds).

#23 The all-way stop-controlled Neroly Road/Live Oak Avenue intersection would operate at LOS F (delay > 60 seconds) during both AM and PM peak hour and would satisfy the MUTCD peak hour signal warrant.

CUMULATIVE NO RAMPS WITH PROJECT CONDITIONS

The AM and PM peak hour traffic volumes generated by the project and described in Chapter 3 were added to the Cumulative No Ramps No Project conditions traffic volumes to estimate the Cumulative No Ramps With Project volumes. The AM and PM peak hour traffic volumes are shown on Figure E-2.

Table E-1 summarizes the intersection LOS analysis results of the Cumulative No Ramps With Project conditions. Appendix B contains the LOS calculation worksheets. Based on significance criteria presented in Chapter 1, the following study intersections would continue to operate at unacceptable service levels under Cumulative No Ramps With Project conditions. These intersections would operate at unacceptable service levels regardless of the proposed project. However, the proposed project would contribute to the unacceptable service levels:

#2 The stop-controlled northbound approach at the side-street stop-controlled Wilbur Avenue/Vierra Avenue intersection would operate at LOS E during the AM peak hour (delay = 41 seconds) and LOS F (delay = 59 seconds) during the PM peak hour. However, the intersection volumes would not satisfy the MUTCD peak hour signal warrant. Thus, the proposed project would not cause a significant impact at this intersection under Cumulative No Ramps With Project conditions.

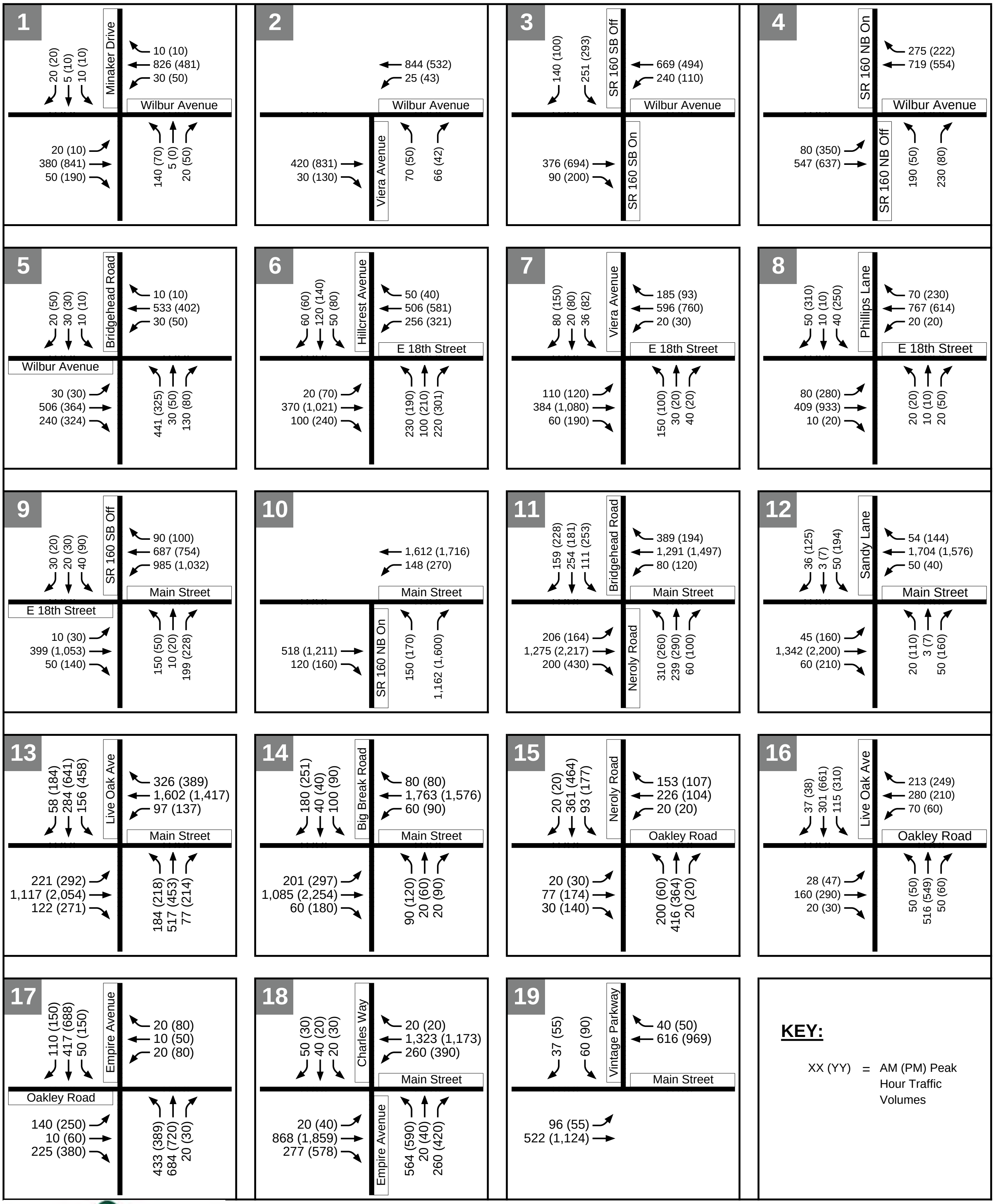
#3 The stop-controlled southbound approach at the side-street stop-controlled Wilbur Avenue/SR 160 southbound ramps intersection would operate at LOS F (delay > 60 seconds) during both AM and PM peak hour, and the intersection would satisfy the MUTCD peak hour signal warrant.

#4 The stop-controlled northbound approach at the side-street stop-controlled Wilbur Avenue/SR 160 northbound ramps intersection would operate at LOS F during both AM and PM peak hours (delay > 60 seconds). The intersection would satisfy the MUTCD peak hour signal warrant.

#5 The all-way stop-controlled Wilbur Avenue/Bridgehead Road intersection would operate at LOS F (delay > 60 seconds) during both AM and PM peak hours. The intersection would satisfy the MUTCD peak hour signal warrant.

#15 The all-way stop-controlled Oakley Road/Neroly Road intersection would operate at LOS F (delay > 60 seconds) during both AM and PM peak hours. The intersection would satisfy the MUTCD peak hour signal warrant.

#16 The all-way stop-controlled Oakley Road/Live Oak Avenue intersection would operate at LOS F (delay > 60 seconds) during both AM and PM peak hours and would satisfy the MUTCD peak hour signal warrant.



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CUMULATIVE (2030) NO RAMPS WITH PROJECT PEAK HOUR INTERSECTION VOLUMES

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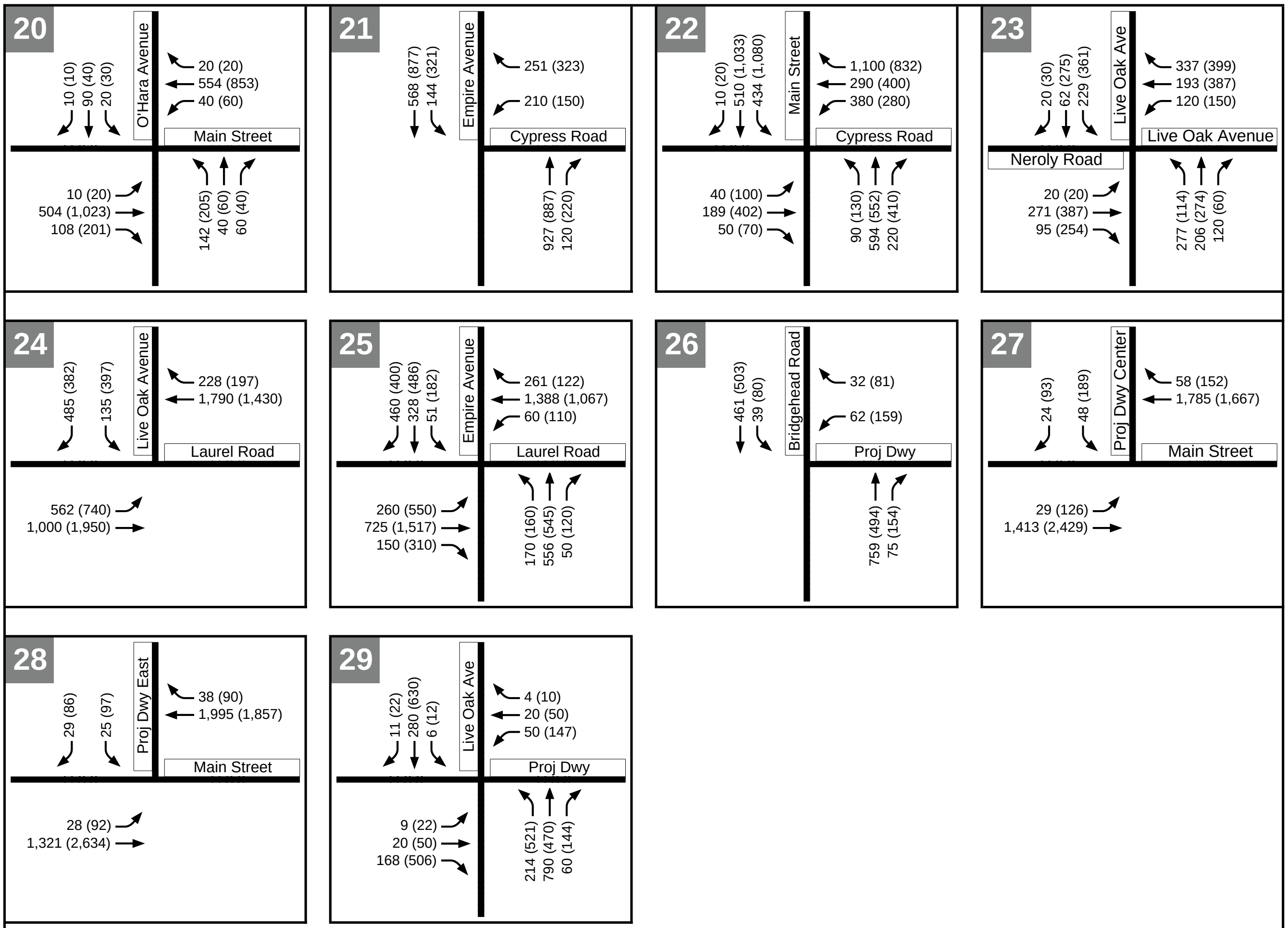
Figure E-2A



KEY:

XX (YY) = AM (PM) Peak Hour Traffic Volumes

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CUMULATIVE (2030) NO RAMPS WITH PROJECT PEAK HOUR INTERSECTION VOLUMES

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Figure E-2B

#18 The signalized Main Street/Empire Avenue intersection would operate at LOS F (v/c = 1.03 and delay = 80 seconds)

#23 The all-way stop-controlled Neroly Road/Live Oak Avenue intersection would operate at LOS F (delay > 60 seconds) during both AM and PM peak hours. The intersection would satisfy the MUTCD peak hour signal warrant.

#25 The signalized Laurel Road/Empire Avenue intersection would operate at LOS F during both AM and PM peak hours (v/c = 1.04 and delay = 80 seconds during the AM peak hour and v/c = 1.06 and delay > 100 seconds during the PM peak hour).

The following intersections would operate at acceptable service levels under Cumulative No Ramp No Project conditions. The addition of project would cause the LOS at these intersections to decline under the No Ramp condition to an unacceptable level:

#11 The signalized Main Street/Neroly Road/Bridgehead Road intersection would operate at LOS E during the PM peak hour (v/c = 0.95 and delay = 62 seconds).

#13 The signalized Main Street/Live Oak Avenue intersection would operate at LOS E during the PM peak hour (v/c = 0.92 and delay = 64 seconds).

CUMULATIVE INTERSECTION IMPACTS AND MITIGATIONS

Based on the application of the significance criteria presented in Table 3, ten significant impacts were identified. Eight of the impacts are at the same intersections as Cumulative With Ramps Conditions impacts presented in Chapter 5. Two impacts, Impacts E-4 and E-5, would only occur if the connector ramps are not constructed. Impacts and mitigation measures for the Cumulative No Ramps conditions are described below.

IMPACT E-1: The addition of project traffic to side-street stop-controlled Wilbur Avenue/SR 160 southbound ramps intersection (#3) would contribute to the unacceptable LOS F conditions during both AM and PM peak hours. The forecasted PM peak hour intersection volumes would also satisfy the MUTCD peak hour signal warrant. This is a significant impact under Cumulative No Ramps With Project conditions because the proposed project would contribute to the unacceptable LOS at the intersection.

ANALYSIS: The stop-controlled southbound approach of the intersection would operate at unacceptable LOS F (delay > 60 seconds) during both AM and PM peak hours regardless of the proposed project. The proposed project would contribute to the unacceptable conditions by adding traffic to the intersection. This impact is also significant under Cumulative With Ramps With Project conditions and is similar to Impact 4.

MITIGATION MEASURE E-1: Mitigation of the unacceptable conditions at Wilbur Avenue/SR 160 southbound ramps intersection shall be achieved by implementing Mitigation Measure 4.

The Wilbur Avenue/SR 160 southbound ramps intersection would operate at acceptable LOS during the AM peak hour (LOS A [v/c = 0.56 based on CCTALOS] and LOS B [delay =16 seconds] based on HCM) and acceptable LOS C (v/c = 0.75 and delay = 28 seconds) during the PM peak hour with implementation of this mitigation measure. This impact would be reduced to a ***less-than-significant*** level with the implementation of this mitigation measure.

IMPACT E-2: The addition of project traffic to side-street stop-controlled Wilbur Avenue/SR 160 northbound ramps intersection (#4) would contribute to the unacceptable LOS F conditions during both AM and PM peak hours. The forecasted AM and PM peak hour intersection volumes would also satisfy the MUTCD peak hour signal warrant. This is a significant impact under Cumulative No Ramps With Project conditions because the proposed project would contribute to the unacceptable LOS at the intersection.

ANALYSIS: The stop-controlled northbound approach of the intersection would operate at unacceptable LOS F (delay > 60 seconds) during both AM and PM peak hours regardless of the proposed project. The proposed project would contribute to the unacceptable conditions by adding traffic to the intersection. This impact is also significant under Cumulative With Ramps With Project conditions and is similar to Impact 5.

MITIGATION MEASURE E-2: Mitigation of the unacceptable conditions at Wilbur Avenue/SR 160 northbound ramps intersection shall be achieved by implementing Mitigation Measure 5.

The Wilbur Avenue/SR 160 northbound ramps intersection would operate at acceptable LOS during both AM and PM peak hours (the intersection would operate at LOS A [v/c = 0.47 during the AM peak hour and v/c = 0.48 during the PM peak hour] based on CCTALOS and would operate at LOS A [delay = 9 seconds] during the AM peak hour and LOS B [delay = 14 seconds] during the PM peak hour] based on HCM) with implementation of this mitigation measure. This impact would be reduced to a ***less-than-significant*** level with the implementation of this mitigation measure.

IMPACT E-3: The addition of project traffic to all-way stop-controlled Wilbur Avenue/ Bridgehead Road intersection (#5) would contribute to the unacceptable LOS F conditions during both AM and PM peak hours. The forecasted AM and PM peak hour intersection volumes would also satisfy the MUTCD peak hour signal warrant. This is a significant impact under Cumulative No Ramps With Project conditions because the proposed project would contribute to the unacceptable LOS at the intersection.

ANALYSIS: The all-way stop-controlled intersection would operate at unacceptable LOS F (delay > 60 seconds) during both AM and PM peak hours regardless of the proposed project. The proposed project would contribute to the unacceptable conditions by adding traffic to the intersection during both AM and PM peak hours. This impact is also significant under Cumulative With Ramps With Project conditions and is similar to Impact 6.

MITIGATION MEASURE E-3: Mitigation of the unacceptable conditions at Wilbur Avenue/Bridgehead Road intersection shall be achieved by implementing Mitigation Measure 6.

The Wilbur Avenue/Bridgehead Road intersection would operate at acceptable LOS during both AM and PM peak hours (during the AM peak hour, the intersection would operate at LOS C [v/c = 0.77] based on CCTALOS and LOS D [delay = 46 seconds]; and during the PM peak hour, the intersection would operate at LOS B [v/c = 0.70] based on CCTALOS and LOS C [delay = 34 seconds]) with implementation of this mitigation measure. This impact would be reduced to a ***less-than-significant*** level with the implementation of this mitigation measure.

IMPACT E-4: The addition of project traffic would cause the signalized Main Street/Neroly Road/Bridgehead Road intersection (#11) to operate at unacceptable LOS E during the PM peak hour, causing a significant impact under Cumulative No Ramps With Project conditions.

ANALYSIS: The intersection would operate at an acceptable LOS D under Cumulative No Ramps No Project conditions (v/c = 0.83 and delay = 44 seconds) during the PM peak hour. The proposed project would cause the intersection to operate at unacceptable LOS E (v/c = 0.95 and delay = 62 seconds) during the PM peak hour. The intersection would operate at a deficient level due to project traffic added to all approaches of the intersection. This impact is not significant under the Cumulative With Ramps With Project conditions.

MITIGATION MEASURE E-4: Mitigation of the unacceptable conditions at Main Street/Neroly Road/Bridgehead Road intersection shall be achieved by converting the second exclusive left-turn lane to a share left-turn/through lane on the northbound approach. This improvement is not included in any funding document. The proposed project shall construct this improvement.

The Main Street/Neroly Road/Bridgehead Road intersection would operate at LOS D (v/c = 0.86 and delay = 46 seconds) during the PM peak hour with implementation of this mitigation measure. This impact would be reduced to a ***less-than-significant*** level with the implementation of this mitigation measure.

IMPACT E-5: The addition of project traffic would cause the signalized Main Street/Live Oak Avenue intersection (#13) to operate at unacceptable LOS E during the PM peak hour, causing a significant impact under Cumulative No Ramps With Project conditions.

ANALYSIS: The intersection would operate at an acceptable LOS under Cumulative No Ramps No Project conditions (LOS B [v/c = 0.67] based on CCTALOS and LOS C [delay = 28 seconds] based on HCM) during the PM peak hour. The proposed project would cause the intersection to operate at unacceptable LOS E (v/c = 0.92 and delay = 64 seconds) during the PM peak hour. The intersection would operate at a deficient level due to project traffic added to the all approaches of the intersection. This impact is not significant under the Cumulative With Ramps With Project conditions.

MITIGATION MEASURE E-5: Mitigation of the unacceptable conditions at Main Street/Live Oak Avenue intersection shall be achieved by adding an exclusive right-turn lane on the southbound approach. This improvement is not is included in any funding document. The proposed project shall construct this improvement.

The Main Street/Live Oak Avenue intersection would operate at LOS D (v/c = 0.85 and delay = 48 seconds) during the PM peak hour with implementation of this mitigation measure. This impact would be reduced to a ***less-than-significant*** level with the implementation of this mitigation measure.

IMPACT E-6: The addition of project traffic to the all-way stop-controlled Oakley Road/Neroly Road intersection (#15) would contribute to unacceptable LOS F conditions during both AM and PM peak hours. The forecasted AM and PM peak hour intersection volumes would also satisfy the MUTCD peak hour signal warrant. This is a significant impact under Cumulative No Ramps With Project conditions because the proposed project would contribute to the unacceptable LOS at the intersection.

ANALYSIS: The all-way stop-controlled intersection would operate at unacceptable LOS F (delay > 60 seconds) during both AM and PM peak hours regardless of the proposed project. The proposed project would contribute to the already unacceptable conditions by adding additional northbound and southbound traffic to the intersection during both AM and PM peak hours. This impact is also significant under Cumulative With Ramps With Project conditions and is similar to Impact 7.

MITIGATION MEASURE E-6: Mitigation of the unacceptable conditions at the Oakley Road/Neroly Road intersection shall be achieved by implementing Mitigation Measure 7.

The Oakley Road/Neroly Road intersection would operate at acceptable LOS (LOS A [v/c = 0.59 during the AM peak hour and v/c = 0.54 during the PM peak hour] based on CCTALOS and LOS C [delay = 29 seconds during the AM peak hour and delay = 27 seconds during the PM peak hour] based on HCM) with implementation of this mitigation measure. This impact would be reduced to a ***less-than-significant*** level with the implementation of this mitigation measure.

IMPACT E-7: The addition of project traffic to the all-way stop-controlled Oakley Road/Live Oak Avenue intersection (#16) would contribute to unacceptable LOS F conditions during both AM and PM peak hours. The forecasted AM and PM peak hour intersection volumes would also satisfy the MUTCD peak hour signal warrant. This is a significant impact under Cumulative No Ramps With Project conditions because the proposed project would contribute to the unacceptable LOS at the intersection.

ANALYSIS: The all-way stop-controlled intersection would operate at unacceptable LOS F (delay > 60 seconds) during both AM and PM peak hours regardless of the proposed project. The proposed project would contribute to the already unacceptable conditions by adding additional northbound and southbound traffic to the intersection during both AM and PM peak hours. This impact is also significant under Cumulative With Ramps With Project conditions and is similar to Impact 8.

MITIGATION MEASURE E-7: Mitigation of the unacceptable conditions at the Oakley Road/Live Oak Avenue intersection shall be achieved by implementing Mitigation Measure 2.

The Oakley Road/Live Oak Avenue intersection would operate at acceptable LOS (LOS A [v/c = 0.60] based on CCTALOS and LOS C [delay = 27 seconds] based on HCM during the AM peak hour; and LOS C [v/c = 0.79] based on CCTALOS and LOS D [delay = 43 seconds] based on HCM during the PM peak hour) with implementation of this mitigation measure. This impact would be reduced to a ***less-than-significant*** level with the implementation of this mitigation measure.

IMPACT E-8: The addition of project traffic would cause the signalized Main Street/Empire Avenue intersection (#18) to operate at unacceptable LOS F during the PM peak hour, causing a significant impact under Cumulative No Ramps With Project conditions.

ANALYSIS: The intersection would operate at unacceptable LOS E (v/c = 0.91 and delay = 56 seconds) during the PM peak hour under Cumulative No Ramps No Project conditions. The proposed project would cause the intersection to operate at unacceptable LOS F (v/c = 1.03 and delay = 80 seconds) during the PM peak hour. The intersection would operate at a deficient level due to project traffic added to northbound left, westbound through, and eastbound through and right movements at the intersection. This impact is also significant under Cumulative With Ramps With Project conditions and is similar to Impact 9.

MITIGATION MEASURE E-8: Mitigation of the unacceptable conditions at the Main Street/Empire Avenue intersection shall be achieved by implementing Mitigation Measure 9.

The Main Street/Empire Avenue intersection would operate at LOS D (delay = 45 seconds) during the PM peak hour based on the HCM method with implementation of this mitigation measure. However, the intersection would continue to operate at LOS E (v/c = 0.92) based on the CCTALOS method. The CCTALOS method analyzes the intersection as an isolated intersection and does not account for the effects of the nearby Empire Avenue/Oakley Road intersection or the vehicle platooning on Main Street resulting from the upstream signals on both eastbound and westbound Main Street. Since the HCM method accounts for these effects, its results are estimated to be more accurate for the Main Street/Empire Avenue intersection. This impact would be reduced to a ***less-than-significant*** level with the implementation of this mitigation measure. Traffic operations at the Oakley Road/ Empire Avenue intersection (#17) would also improve with the implementation of this mitigation measure.

IMPACT E-9: The addition of project traffic to the all-way stop-controlled Neroly Road/Live Oak Avenue intersection (#23) would contribute to unacceptable LOS F conditions during both AM and PM peak hours. The forecasted AM and PM peak hour intersection volumes would also satisfy the MUTCD peak hour signal warrant. This is a significant impact under Cumulative No Ramps With Project conditions.

ANALYSIS: The all-way stop-controlled intersection would operate at unacceptable LOS F (delay > 60 seconds) during both AM and PM peak hours regardless of the proposed project. The proposed project would contribute to the unacceptable conditions due to project traffic added to the southbound through and left-turn, northbound through, and westbound right-turn movements at the intersection. This impact is also significant under Cumulative With Ramps With Project conditions and is similar to Impact 10.

MITIGATION MEASURE E-9: Mitigation of the unacceptable conditions at the Neroly Road/Live Oak Avenue intersection shall be achieved by implementing Mitigation Measure 3.

The Neroly Road/Live Oak Avenue intersection would operate at acceptable LOS (LOS A [v/c = 0.55] based on CCTALOS and LOS C [delay = 28 seconds] based on HCM during the AM peak hour; and LOS C [v/c = 0.71] based on CCTALOS and LOS D [delay = 39 seconds] based on HCM during the PM peak hour) with implementation of this mitigation measure. This impact would be reduced to a ***less-than-significant*** level with the implementation of this mitigation measure.

IMPACT E-10: The addition of project traffic to the signalized Laurel Road/Empire Avenue intersection (#25) would contribute to the unacceptable LOS F conditions during both AM and PM peak hours.

ANALYSIS: The intersection would operate at an unacceptable LOS F during both AM and PM peak hours under Cumulative No Ramps No Project conditions (v/c = 1.03 and delay = 75 seconds during the AM peak hour, and v/c = 1.02 and delay = 95 seconds during the PM peak hour). The intersection would continue to operate at unacceptable LOS F conditions (v/c = 1.04 and delay = 80 seconds during the AM peak hour, and v/c = 1.06 and delay > 100 seconds during the PM peak hour) with the addition of project generated traffic. The intersection would operate at a deficient level regardless of the proposed project. The proposed project would result in a further decline in an already unacceptable LOS at this intersection by adding traffic to the northbound and southbound approaches of the intersection. This impact is also significant under Cumulative With Ramps With Project conditions and is similar to Impact 11.

MITIGATION MEASURE E-10: Mitigation of the unacceptable conditions at the Laurel Road/Empire Avenue intersection shall be achieved by implementing Mitigation Measure 3.

The Laurel Road/Empire Avenue intersection would operate acceptable LOS (LOS C [v/c = 0.80 during both AM and PM peak hours] based on CCTALOS and LOS D [delay = 36 seconds during the AM peak hour and delay = 46 seconds during the PM peak hour] based on HCM) with implementation of this mitigation measure. This impact would be reduced to a ***less-than-significant*** level with the implementation of this mitigation measure.

CUMULATIVE NO RAMPS WITH PROJECT MITIGATED CONDITIONS

All study intersections would operate at acceptable conditions with the implementation of the recommended mitigation measures outlined in the previous section. Table E-2 summarizes the intersection LOS at the study intersection after the implementation of these recommended improvements.

CUMULATIVE NO RAMPS CONDITIONS FREEWAY OPERATIONS ANALYSIS

Table 14 summarizes the freeway delay index analysis results under Cumulative No Ramps No Project and Cumulative No Ramps With Project conditions. Based on the analysis, the study freeway segments would satisfy their established TSO.

TABLE E-2
MITIGATED CUMULATIVE (2030) NO RAMPS WITH PROJECT CONDITIONS
INTERSECTION PEAK HOUR LOS SUMMARY

Study Intersection	**Control[1]**	**Peak Hour**	**CUMULATIVE WITH PROJECT**				**CUMULATIVE WITH PROJECT MITIGATED**			
			CCTALOS		**HCM**		**CCTALOS**		**HCM**	
			V/C Ratio[2]	**LOS**	**Delay[3]**	**LOS**	**V/C Ratio[2]**	**LOS**	**Delay[3]**	**LOS**
3. Wilbur Avenue/SR 160 SB Ramps	SSSC/ Signal	AM PM	-- --	-- --	**>60 (>60)** **>60 (>60)**	**F (F)** **F (F)**	0.56 0.75	A C	16 28	B C
4. Wilbur Avenue/SR 160 NB Ramps	SSSC/ Signal	AM PM	-- --	-- --	27 **(>60)** 15 **(>60)**	D **(F)** B **(F)**	0.47 0.48	A A	9 14	A B
5. Wilbur Avenue/Bridgehead Road	AWSC/ Signal	AM PM	-- --	-- --	**>60** **>60**	**F** **F**	0.77 0.70	C B	46 34	D C
11. Main Street/Bridgehead Road/Neroly Road	Signal	AM PM	0.72 **0.95**	C **E**	32 **62**	C **E**	0.67 0.86	B D	33 46	C D
13. Main Street/Live Oak Avenue	Signal	AM PM	0.76 **0.92**	C **E**	36 **64**	D **E**	0.70 0.85	B D	23 48	C D
15. Oakley Road/Neroly Road	AWSC/ Signal	AM PM	-- --	-- --	**>60** **>60**	**F** **F**	0.59 0.54	A A	29 27	C C
16. Oakley Road/Live Oak Avenue	AWSC/ Signal	AM PM	-- --	-- --	**>60** **>60**	**F** **F**	0.60 0.79	A C	27 43	C D
17. Oakley Road/Empire Avenue	Signal	AM PM	0.58 0.83	A D	23 53	C D	0.49 0.67	A B	32 41	C D
18. Main Street/Empire Avenue	Signal	AM PM	0.65 **1.03**	B **F**	28 **80**	C **F**	0.64 **0.92**	B **E**	27 45	C D
23. Neroly Road/Live Oak Avenue	AWSC/ Signal	AM PM	-- --	-- --	**>60** **>60**	**F** **F**	0.55 0.71	A C	28 39	C D
25. Laurel Road/Empire Avenue	Signal	AM PM	**1.04** **1.06**	**F** **F**	**80** **>100**	**E** **F**	0.80 0.80	C C	36 46	D D

Bold indicates intersection operating at deficient level of service.

1. Signal = Signalized intersection
   SSSC = Side-street stop-controlled intersection
   AWSC = All-way stop-controlled intersection
2. Volume-to-capacity ratio (V/C) determined for all signalized intersections using the CCTALOS methodology.
3. Average intersection delay is calculated for all signalized and unsignalized intersections using the 2000 *Highway Capacity Manual* (HCM) methods. For side-street stop-controlled intersections, average intersection delay (in seconds per vehicle) is presented. Delay for worst approach is shown in brackets.

Source: Fehr & Peers, 2006.

TABLE E-3
CUMULATIVE (YEAR 2030) NO RAMPS CONDITIONS
FREEWAY DELAY INDEX SUMMARY

Freeway Segment	Peak Hour	TSO[1]	Cumulative No Project		Cumulative With Project	
			EB or NB[2]	WB or SB[3]	EB or NB[2]	WB or SB[3]
SR 4 between Hillcrest Avenue and SR 160/SR 4 Bypass	AM PM	2.5 2.5	1.0 1.1	1.3 1.0	1.0 1.1	1.3 1.1
SR 160 between SR 4/SR 4 Bypass and Main Street	AM PM	2.5 2.5	1.0 1.1	1.2 1.0	1.1 1.2	1.3 1.1
SR 160 between Main Street and Wilbur Avenue	AM PM	2.0 2.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0
SR 160 between Wilbur Avenue and Antioch Bridge Toll Plaza	AM PM	2.0 2.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0
SR 4 Bypass between SR 4/SR 160 and Laurel Road	AM PM	2.0 2.0	1.3 1.0	1.0 1.2	1.4 1.0	1.0 1.2
SR 4 Bypass between Laurel Road and Lone Tree Way	AM PM	2.0 2.0	1.2 1.0	1.1 1.5	1.3 1.0	1.1 1.6

Results in **bold** represent freeway segments exceeding established TSO.

1. TSO as established by CCTA.
2. Delay index in the eastbound or northbound directions.
3. Delay index in the westbound or southbound directions.

Source: Fehr & Peers, 2006.

CUMULATIVE NO RAMPS CONDITIONS SUMMARY

The eight significant impacts identified in the Cumulative conditions analysis in Chapter 5 continue to be significant if the SR 160 – SR 4 Bypass connector ramps are not constructed. The identified mitigation measures would continue to be valid and mitigate the impacts to less-than-significance levels. In addition, if the SR 160 – SR 4 Bypass connector ramps are not constructed, the proposed project would cause impacts at two additional intersections, Main Street/Bridgehead Road/Neroly Road, and Main Street/Live Oak Avenue. These impacts can be mitigated to less-than-significant levels by Mitigation Measures E-4 and E-5.

Appendix D

Environmental Noise Assessment

Environmental Noise Assessment

Cline Specific Plan EIR

Oakley, California
BAC Job # 2006-093

Prepared For:

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Jason Mirise, Vice President

March 6, 2007

BOLLARD
Acoustical Consultants

ENVIRONMENTAL SETTING

Project Location and Description

The project site is located on the northeast corner of Bridgehead Road and Main Street/Highway 4, south of the Burlington Northern Santa Fe Railroad (BNSF), in the City of Oakley, California. The project is approximately 76 acres and proposes the construction of up to 770,000 sq. ft. of commercial building space, including a “big-box” retailer of clothing or other durable goods (Major Pad “A”), a “big-box” super center (Major Pad B), and a “big-box” home improvement center (Major Pad C). Please refer to the attached project site plan graphic.

Acoustical Terminology

Noise is often described as unwanted sound. Sound is defined as any pressure variation in air that human hearing can detect. The number of pressure variations per second is called the frequency of sound, and is expressed as cycles per second, or Hertz (Hz). Human hearing is generally capable of detecting sound between 20 Hz and 20,000 Hz.

Human hearing is generally capable of processing these pressure variations (sound) over an extremely broad dynamic range; therefore, the measurement of sound directly in terms of pressure would require a very large and awkward range of numbers. The logarithmic treatment of these numbers – converting measured sound pressure (Pa) into sound pressure level (decibels, dB) – was developed primarily to limit the range of numbers. The decibel scale allows for 5 orders of magnitude in sound pressure to be expressed within a range of 100 dB.

The perceived loudness of sounds is dependent on many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by the A-weighting network. There is a strong correlation between A-weighted sound levels (expressed as dBA) and the way human hearing perceives noise. For this reason, the A-weighted sound level has become a standard tool for environmental noise assessment. All noise levels reported in this section are in terms of A-weighting.

Community noise is commonly described in terms of the "ambient" noise level, which is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool used to measure the ambient noise level is the average, or equivalent sound level (L_{eq}), which corresponds to a steady-state, A-weighted sound level containing the same total energy as a time-varying signal over a given time period (usually one hour). The L_{eq} is the foundation for the Day/Night Average Level (L_{dn}).

The L_{dn} is based on the average noise level over a continuous 24-hour period, with a +10 dB weighting applied to noise occurring during nighttime (10 p.m. - 7 a.m.) hours. The nighttime penalty is based on the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because L_{dn} represents a 24-hour average, it tends to disguise short-term variations in the noise environment.

Table 1 provides definitions of acoustical terminology relevant to this study.

TABLE 1
ACOUSTICAL TERMINOLOGY

Acoustics	The science (or physics) of sound.
Ambient Noise	The distinctive acoustical characteristics of a given environment consisting of all noise sources audible at a given location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.
Attenuation	The reduction of noise.
A-Weighting	A frequency-response filter that conditions a given sound signal to approximate human response.
CNEL	Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 p.m. - 10 p.m.) weighted by a factor of three and nighttime hours (10 p.m. - 7 a.m.) weighted by a factor of 10 prior to averaging.
Decibel or dB	A Bel is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bel.
Frequency	The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz (Hz).
L_{dn}	Day/Night Average Level. Similar to CNEL but with no evening weighting. The hours of 7 a.m. – 10 p.m. are considered daytime.
L_{eq}	Equivalent or energy-averaged sound level.
L_{max}	The highest root-mean-square (RMS) sound level measured over a given period of time.
L_n	The measured sound pressure level exceeded (n) percent of the time.
Loudness	A subjective term for the sensation of the magnitude of sound.
Noise	Unwanted sound.
Threshold of Hearing	The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB at 1,000 Hz for persons with good hearing.
SEL	A single-number rating indicating the total energy of a discrete noise event compressed into a 1-second time duration.

Existing Land Uses in the Project Vicinity

The project site is currently vacant and undeveloped with the exception of agricultural grape production activities. The project site is bordered to the north by the BNSF and industrial uses, to the south by Main Street/Highway 4 and commercial uses, to the west by commercial and residential uses, and to the east by residential uses.

Noise-sensitive land uses in the immediate project vicinity include the existing hotel and mobile home park to the west (west side of Bridgehead Road), and the existing single-family residential development located approximately one-quarter mile to the east (east side of Big Break Road). A six-foot high masonry wall currently separates this residential development from Big Break Road.

Existing Ambient Noise Environment in the Project Vicinity

The existing ambient noise environment in the immediate project vicinity is defined almost entirely by traffic on Main Street/Highway 4 and other smaller roadways, BNSF rail operations, and commercial/industrial uses.

Ambient noise level measurements were completed for the City's 2020 General Plan in March 2001. Two of the measurement sites used in that study are relatively close to the project area, and are used in this analysis to quantify existing ambient noise exposure within noise-sensitive areas in the project vicinity. The ambient noise measurement locations and results are summarized in Table 2.

TABLE 2
SUMMARY OF AMBIENT NOISE LEVEL MEASUREMENTS
MARCH 2001
OAKLEY 2020 GENERAL PLAN

Site	Location	L_{eq}, dB	L_{max}, dB	L_{dn}, dB	Noise Sources
2	1942 E. Summerfield Court	71-75	82-85	80	Traffic and Railroad
6	Live Oak Avenue	52-53	57-61	NA	Traffic

Source: Bollard & Brennan, Inc.

Roadway Traffic Noise

To predict existing noise levels due to traffic, the Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used. The Model is based on the Calveno reference noise factors for automobiles, medium trucks, and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the project site. The FHWA Model was developed to predict hourly L_{eq} values for free-flowing traffic conditions. A day/night traffic distribution of 83%/17% was factored into the calculations to determine L_{dn}, consistent with noise and traffic data compiled as part of the Oakley 2020 General Plan.

Traffic volumes for existing conditions were obtained from the Traffic Impact Study prepared for the project by Fehr & Peers Transportation Consultants (February 2007). The data within that report is in the form of AM/PM peak-hour intersection turning movements, which was converted to ADT by Bollard Acoustical Consultants, Inc. In this case, ADT was calculated by multiplying the A.M. Peak Hour volumes by a factor of 10. This is a calculation commonly made to approximate ADT.

Table 3 shows the existing traffic noise levels in terms of L_{dn} at a reference distance of 75 feet from the centerlines of existing project-area roadways. This is considered to be the baseline condition. The table also includes the distances to existing traffic noise contours.

Most of the project uses (e.g., retail, restaurant) are not considered to be noise-sensitive, and are not expected to be impacted by perimeter roadway traffic noise exposure. The proposed project Hotel (Pad T), although a noise-sensitive use, is well removed from Main Street/Highway 4 and would not likely be impacted by traffic-related noise.

TABLE 3
EXISTING TRAFFIC NOISE LEVELS AND CONTOUR DISTANCES
CLINE SPECIFIC PLAN EIR – OAKLEY, CALIFORNIA

			Distance to Noise Contour (feet)		
Roadway	**Segment**	**L_{dn} (dB) @ 75 Feet**	**70 dB L_{dn}**	**65 dB L_{dn}**	**60 dB L_{dn}**
Bridgehead Road	North of Wilbur Road	52	5	10	22
Bridgehead Road	Main Street - Wilbur Road	60	16	34	72
Bridgehead Road	Main Street - Project Entrance	60	16	34	72
Bridgehead Road	Project Entrance - Wilbur Avenue	60	16	34	72
Wilbur Avenue	West of Minaker Drive	59	15	32	68
Wilbur Avenue	Minaker Drive - Viera Avenue	59	13	28	60
Wilbur Avenue	Viera Avenue - SR 160 SB Ramps	59	15	31	67
18th Street	Hillcrest Avenue - Viera Avenue	61	20	43	93
18th Street	Viera Avenue - Phillips Lane	60	16	34	73
Phillips Lane	South of 18th Street	45	2	4	8
Main Street	Neroly Lane - Sandy Lane	69	64	138	297
Main Street	Sandy Lane - Live Oak Avenue	69	64	137	295
Main Street	Live Oak Avenue - Big Break Road	69	61	132	285
Main Street	Big Break Road - Empire Avenue	69	60	129	277
Main Street	Empire Avenue - Vintage Parkway	68	52	112	241
Main Street	Vintage Pkwy - O'Hara Avenue	68	53	114	245
Oakley Road	West of Neroly Road	55	7	16	35
Oakley Road	Neroly Road - Live Oak Avenue	57	10	21	45
Oakley Road	Live Oak Avenue - Empire Avenue	58	12	26	57
W. Cypress Road	Empire Avenue - Main Street	58	11	24	52
Neroly Lane	Main Street - Oakley Road	61	18	39	84
Neroly Lane	South of Oakley Road	60	16	34	72
Sandy Lane	South of Main Street	31	0	0	1
Live Oak Avenue	Main Street - Oakley Road	54	7	14	30
Live Oak Avenue	South of Oakley Road	55	7	15	32
Big Break Road	North of Main Street	58	12	25	54
Empire Avenue	Oakley Road - W. Cypress Road	62	22	47	102
Empire Avenue	W. Cypress Road - Laurel Road	61	18	38	83

Source: FHWA-RD-77-108 with inputs from Fehr & Peers Transportation Consultants (November 2006) and Bollard Acoustical Consultants, Inc.

REGULATORY SETTING

In order to limit population exposure to physically and/or psychologically damaging noise levels, the State of California, various county governments, and most municipalities in the state have established standards and ordinances to control noise. The City of Oakley 2020 General Plan Noise Element and CEQA provide thresholds regarding noise levels relevant to the proposed project. The following provides a general overview of the existing thresholds established by the City and CEQA.

City of Oakley General Plan Noise Exposure Criteria

The City of Oakley General Plan Noise Element sets forth land use compatibility criteria for various community land uses. For noise generated by transportation noise sources such as traffic, the Noise Element specifies that residential land uses are compatible with exterior noise levels of up to 65 dB L_{dn} without the need for noise mitigation. The 65 dB L_{dn} noise level is considered an acceptable noise environment for residential outdoor activities. The City may allow an exterior noise level of up to 70 dB L_{dn} provided that available exterior noise level reduction measures have been implemented and interior noise levels are in compliance with the City's standard.

The City's interior noise level criterion of 45 dB L_{dn} is specified in the Noise Element for residential land uses exposed to transportation noise sources. The intent of this interior noise standard is to provide a suitable environment for indoor communication and sleep.

In addition to the L_{dn} criteria discussed above, the City has established noise level performance criteria regarding non-transportation noise exposure at noise-sensitive uses. These standards are summarized in Table 4 and apply to the proposed commercial uses.

TABLE 4
NOISE LEVEL PERFORMANCE STANDARDS – NON-TRANSPORTATION NOISE SOURCES
NOISE ELEMENT OF THE OAKLEY 2020 GENERAL PLAN

Noise Level Descriptor	Daytime (7 a.m. – 10 p.m.)	Nighttime (10 p.m. – 7 a.m.)
Hourly Average (L_{eq}, dB)	55	45

Note: Standard applicable at property line of receiving land use.

Evaluation of Changes in Ambient Noise Levels

The potential increase in traffic noise exposure due to the project is a factor in determining significance. Research into the human perception of changes in sound level indicates the following.

- A 3 dB change is barely perceptible,
- A 5 dB change is clearly perceptible, and
- A 10 dB change is perceived as being twice or half as loud.

A limitation of using a single noise level increase value to evaluate noise impacts is that it fails to account for pre-project ambient noise conditions. Table 5 is based on recommendations made in August 1992 by the Federal Interagency Committee on Noise (FICON) to provide guidance in the assessment of changes in ambient noise levels resulting from aircraft operations. The recommendations are based on studies that relate aircraft noise levels to the percentage of persons highly annoyed by the noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, it has been accepted through research that they are applicable to all sources of noise described in terms of cumulative noise exposure metrics such as the L_{dn}. Specifically, they provide good correlation to transportation-related noise sources.

TABLE 5
SIGNIFICANCE OF CHANGES IN CUMULATIVE NOISE EXPOSURE

Noise Level Without Project (L_{dn})	Increase Required for Significant Impact
<60 dB	+5.0 dB or more
60-65 dB	+3.0 dB or more
>65 dB	+1.5 dB or more

Source: Federal Interagency Committee on Noise (FICON), August 1992

An increase in the traffic noise levels becomes more important as the ambient noise levels increase. For instance, a significant increase in traffic noise levels is expected to be 1.5 dB when the no-project traffic noise levels exceed 65 dB L_{dn}. However, a significant increase in traffic noise levels is expected to be 5 dB when the no-project traffic noise levels are less than 60 dB L_{dn}. In other words, as ambient noise levels increase, a smaller increase in noise resulting from the project is sufficient to cause annoyance.

Thresholds of Significance

The criteria for determining the significance of noise impacts are based on information contained in the State CEQA Guidelines. According to the Guidelines, a project may have a significant effect on the environment if it will satisfy the following conditions:

a. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;

b. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;

c. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;

d. Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.

Noise impacts associated with the proposed project itself, or in combination with future development (cumulative growth) would be considered significant if they would either: (1) exceed the FICON thresholds presented in Table 5 for transportation-related noise; or (2) exceed the non-transportation daytime or nighttime thresholds identified in Table 4. As discussed below, project traffic, parking lot operations, on-site truck movements, loading dock operations, mechanical equipment operation, cumulative permanent noise increases, and temporary construction noise exposure have all been analyzed with respect to the foregoing thresholds of significance.

NOISE IMPACTS ANALYSES

The identified noise-producing elements associated with this project are increased traffic on the local roadway network, parking lot activities, heavy truck movements primarily associated with the super-center and home improvement center, loading dock activities primarily associated with the three big-box retailers (clothing or other durable goods, super-center and home improvement center), rooftop HVAC equipment (Buildings A-C), and project construction.

The analyses that follow are based on our best estimate of the future project uses, and in some cases are based on information collected for past projects involving similar uses. The following is provided as a best estimate of noise exposure from these future uses, and is not based on specific information provided by future Final Development Plan applicants.

Traffic

To assess noise impacts due to project-related traffic increases on the local roadway network, traffic noise levels were predicted at a representative distance (75 feet from the roadway centerlines) for the Existing + Project, Cumulative (2030), and Cumulative (2030) + Project conditions. The traffic noise levels were predicted using the same modeling methodology used for the Existing scenario described in the Environmental Setting section above. Results of this analysis are summarized in Table 6.

As shown in Table 6, it is expected that significant project-related noise exposure increases may be expected along parts of Sandy Lane and Live Oak Avenue in the project vicinity.

Project Parking Lots (West Side)

As a means of determining potential noise exposure due to project parking lot activities, Bollard Acoustical Consultants, Inc. utilized noise level data collected for previous parking lot noise studies (including those conducted for supercenters and other big-box uses). A typical sound exposure level (SEL) due to an automobile arrival/departure, including car doors closing and people conversing, is approximately 77 dB at a distance of 25 feet. This SEL would be approximately 64 dB at a distance of 115 feet, the distance between the edge of the parking lot and the closest noise-sensitive receiver uses to the west (mobile home park and hotel), assuming a reduction of 6 dB per doubling of distance from the noise source. It is assumed, based on analysis provided in the project Transportation Impact Analysis (Appendix C), that approximately 240 cars could enter or leave the proposed project parking lot within a worst-case hour. Parking lot noise exposure was determined using the following equation.

$$\text{Peak Hour } L_{eq} = 64 + 10\log(240) - 35.6,$$

where 64 is the SEL for a single automobile parking operation, 240 is the number of parking lot operations in a worst-case hour, and 35.6 is 10 times the logarithm of the number of seconds in an hour.

Using the equation and operations data described above, the proposed parking lot could be expected to produce an unmitigated noise exposures of approximately 52 dB Hourly L_{eq} (daytime), and under 45 dB Hourly L_{eq} (nighttime) at the closest noise-sensitive receiver property lines. This noise exposure complies with the daytime noise exposure threshold of 55 dB, and the nighttime noise exposure threshold of 45 dB, and is therefore not expected to produce a significant impact on the closest residential properties.

The noise exposure from non-transportation noise sources to the residential uses to the east were not separately analyzed here or in the other components of this study, because the distance from these noise-sensitive receivers to the closest buildings on site is substantially greater (approximately one-quarter mile), and the exposure would therefore be considerably less.

On-Site Truck Movements

Daily operations of the proposed super-center, home improvement center, and third big-box retailer will include deliveries of goods to the stores via tractor-trailer trucks. Based on information collected by Bollard Acoustical Consultants, Inc. from other noise studies involving big-box retailers (including supercenter, home improvement center, and other durable goods retailers), a maximum of 30 heavy trucks per day could operate on the project site, with a maximum of 4 heavy truck deliveries during a worst-case hour. The expected delivery route would include access off of Main Street/Highway 4 with truck turn-around locations adjacent to each store (see the project site plan). The distance between the closest truck turn-around area and the noise-sensitive receivers (mobile home park and hotel) to the west of the project site is approximately 1,200 feet. This is the distance used in our analysis for this noise source. The distance to noise-sensitive receivers to the east is greater.

TABLE 6
PREDICTED TRAFFIC NOISE LEVELS AT 75 FEET FROM ROADWAY CENTERLINES
CLINE SPECIFIC PLAN EIR B OAKLEY, CALIFORNIA

Roadway	Roadway Segment	Ldn, dB					
		Existing	Existing + Project	Cumulative (2030) B No Ramps No Project	Cumulative (2030) B No Ramps Plus Project	Cumulative (2030) B With Ramps No Project	Cumulative (2030) B With Ramps Plus Project
Bridgehead Road	N. of Wilbur Road	52.1	52.1 (0)	53.1 (1.0)	53.1 (1.0) (0)	53.1 (1.0)	53.1 (1.0) (0)
Bridgehead Road	Main Street - Wilbur Road	59.8	61.4 (1.6)	60.4 (0.6)	61.8 (2.0) (1.4)	59.3 (-0.5)	61.2 (1.5) (1.9)
Bridgehead Road	Main Street - Project Entrance	59.8	61.1 (1.3)	60.4 (0.6)	61.8 (2.0) (1.4)	59.3 (-0.5)	61.2 (1.5) (1.9)
Bridgehead Road	Project Entrance - Wilbur Avenue	59.8	60.9 (1.1)	60.4 (0.6)	61.2 (1.5) (0.9)	59.3 (-0.5)	60.3 (0.5) (1.0)
Wilbur Avenue	W. of Minaker Drive	59.4	59.8 (0.4)	62.4 (3.0)	62.7 (3.3) (0.2)	62.3 (2.9)	62.6 (3.2) (0.3)
Wilbur Avenue	Minaker Drive - Viera Avenue	58.5	59.3 (0.8)	62.1 (3.6)	62.5 (3.9) (0.4)	62.0 (3.4)	62.3 (3.8) (0.4)
Wilbur Avenue	Viera Avenue – SR 160 SB Ramps	59.3	60.0 (0.7)	61.9 (2.5)	62.3 (3.0) (0.5)	61.6 (2.3)	62.1 (2.8) (0.4)
Wilbur Avenue	E. of Bridgehead Road	NA	NA	59.9 (NA)	60.2 (NA) (0.3)	60.0 (NA)	60.4 (NA) (0.4)
18th Street	Hillcrest Avenue - Viera Avenue	61.4	62.0 (0.6)	64.0 (2.6)	64.3 (2.9) (0.3)	63.9 (2.4)	64.2 (2.8) (0.3)
18th Street	Viera Avenue - Phillips Lane	59.9	60.9 (1.0)	63.3 (3.4)	63.7 (3.9) (0.5)	63.1 (3.3)	63.6 (3.8) (0.5)
Phillips Lane	S. of 18th Street	45.1	45.1 (0)	**51.7 (6.7)**	**51.7 (6.7)** (0)	**51.7 (6.7)**	**51.7 (6.7)** (0)
Main Street	Neroly Lane - Sandy Lane	69.0	69.8 (0.8)	70.1 (1.1)	**70.7 (1.7)** (0.6)	70.0 (1.0)	**70.8 (1.8)** (0.8)
Main Street	Sandy Lane - Live Oak Avenue	68.9	69.7 (0.8)	69.9 (1.0)	**70.6 (1.7)** (0.7)	69.8 (0.9)	**70.7 (1.7)** (0.8)
Main Street	Live Oak Avenue - Big Break Road	68.7	69.8 (1.1)	70.1 (1.4)	**71.0 (2.3)** (0.9)	70.0 (1.3)	**70.8 (2.1)** (0.8)
Main Street	Big Break Road - Empire Avenue	68.5	69.6 (1.1)	69.7 (1.2)	**70.6 (2.0)** (0.8)	69.6 (1.1)	**70.4 (1.9)** (0.8)
Main Street	Empire Avenue - Vintage Pkwy	67.6	68.7 (1.1)	66.3 (-1.3)	67.7 (0.1) (1.4)	66.3 (-1.3)	67.6 (0) (1.3)
Main Street	Vintage Pkwy - O'Hara Avenue	67.7	68.7 (1.0)	66.5 (-1.2)	67.7 (0) (1.3)	66.5 (-1.2)	67.6 (-0.1) (1.2)
Oakley Road	W. of Neroly Road	55.0	55.4 (0.4)	57.6 (2.6)	57.8 (2.8) (0.2)	57.6 (2.6)	57.9 (2.9) (0.3)
Oakley Road	Neroly Road - Live Oak Avenue	56.6	57.1 (0.5)	58.1 (1.5)	58.4 (1.8) (0.3)	58.1 (1.5)	58.5 (1.8) (0.4)
Oakley Road	Live Oak Avenue - Empire Avenue	58.2	59.3 (1.1)	61.0 (2.8)	61.7 (3.5) (0.7)	60.9 (2.8)	61.7 (3.5) (0.7)
W. Cypress Road	Empire Avenue - Main Street	57.7	58.6 (0.9)	60.1 (2.4)	60.7 (3.0) (0.6)	60.1 (2.4)	60.8 (3.2) (0.7)
Neroly Lane	Main Street - Oakley Road	60.7	61.2 (0.5)	61.6 (0.9)	62.0 (1.3) (0.4)	60.5 (-0.3)	60.8 (0.1) (0.3)
Neroly Lane	S. of Oakley Road	59.8	60.3 (0.5)	60.4 (0.6)	60.9 (1.1) (0.5)	59.5 (-0.3)	59.9 (0.1) (0.4)
Sandy Lane	S. of Main Street	30.6	**42.4 (11.8)**	**57.7 (27.2)**	**57.9 (27.3)** (0.1)	**57.7 (27.2)**	**58.0 (27.4)** (0.2)
Live Oak Avenue	Main Street - Oakley Road	54.1	**60.6 (6.5)**	**60.9 (6.8)**	**63.3 (9.2)** (2.3)	**59.5 (5.4)**	**61.6 (7.5)** (2.1)
Live Oak Avenue	S. of Oakley Road	54.5	**59.7 (5.2)**	**59.9 (5.3)**	**62.1 (7.5)** (2.2)	58.1 (3.6)	**59.7 (5.2)** (1.6)
Big Break Road	N. of Main Street	57.8	58.2 (0.4)	59.5 (1.6)	59.7 (1.9) (0.3)	59.5 (1.6)	59.7 (1.8) (0.2)
Empire Avenue	Oakley Road - W. Cypress Road	62.0	62.9 (0.9)	63.8 (1.8)	64.4 (2.4) (0.6)	63.4 (1.4)	64.1 (2.1) (0.7)
Empire Avenue	W. Cypress Road - Laurel Road	60.6	61.4 (0.8)	63.5 (2.8)	**63.9 (3.3)** (0.4)	63.0 (2.4)	63.5 (2.9) (0.5)

Notes:
Change in first (or only) set of () is with respect to Existing condition (Baseline).
Change in second set of () is with respect to the Cumulative (No Project) condition (reflecting the Project's contribution to Cumulative conditions).
Numbers in **bold** represent a significant increase in noise exposure based on the Federal Interagency Committee on Noise (FICON) guidelines (Table 5).
Source: FHWA-RD-77-108 with inputs from Fehr & Peers Transportation Consultants (November 2006) and Bollard Acoustical Consultants, Inc.

Trucks en route to/from the loading docks are estimated to produce an average SEL of approximately 87 dB at a distance of 50 feet. At the nearest residential properties to the west (approximately 1,200 feet away), the unmitigated SEL associated with truck events on the project site were predicted to be approximately 59 dB, based on an attenuation of 6 dB per doubling of distance from the noise source.

Assuming that 4 truck deliveries (8 total truck trips) could occur during a continuous one-hour period, the calculated truck circulation noise exposure (unmitigated) at the closest residential receivers was calculated to be approximately 32 dB Hourly L_{eq}. This noise exposure complies with the City's noise exposure limits (Daytime threshold of 55 dB and nighttime threshold of 45 dB in Table 4), and is not expected to produce a significant impact on the closest residential properties.

The calculated noise exposure from assumed on-site truck movements does not account for any acoustical shielding provided by intervening project buildings. This shielding would further reduce the noise exposure from this source.

Loading Docks

Primary noise sources associated with the supercenter and home improvement center loading docks include heavy trucks stopping (air brakes), backing into the loading dock (back-up alarm), and pulling out of the loading dock (revving engine). Once a truck has backed into one of the docks, it is generally unloaded from inside of the store using a fork lift or hand cart, and a large portion of the unloading noise is contained within the building and truck trailer.

The proposed loading docks for the supercenter and home improvement center are to be located on the north side of the buildings, approximately 1,400 feet and 2,400 feet from the nearest noise-sensitive receivers to the west, respectively, and approximately 4,000 feet from the nearest noise-sensitive receiver to the east. Measured loading dock noise exposure for similar projects (including big-box supercenters and home improvement centers, based on other studies by Bollard Acoustical Consultants, Inc.) was approximately 63 dB L_{eq} at a distance of 50 feet from the center of the loading docks. This level represents continuous activity at the measured loading docks, including activity from all of the above-mentioned noise sources. Assuming a noise attenuation of 6 dB per doubling of distance from the loading dock, unmitigated loading dock noise exposure at the closest noise-sensitive receivers to the west would be approximately 35 dB Hourly L_{eq}. This represents a conservative estimate of cumulative loading dock noise exposure from the super-center and home improvement center at the closest affected residences to the west of the site. This noise exposure complies with the City's daytime and nighttime noise exposure thresholds of 55 dB and 45 dB, respectively, and is not expected to produce a significant impact on the closest residential properties.

The calculated noise exposure from assumed loading lock activities does not account for any acoustical shielding provided by intervening project buildings. This shielding would further reduce the noise exposure from this source. Operation of the big-box uses is expected to include the distribution of materials from the loading docks, internally within the stores, with incidental distribution of garden materials to outdoor enclosures located between the Major Retail buildings depicted in the Preliminary Development and Land Use Plan. As described above, fork lift vehicles are expected to be utilized in the loading and unload of trucks, and may also be utilized for incidental loading of customer vehicles adjoining the buildings. Fork lift operations include back-up signals which will produce short-term sound levels audible within the parking lot. All of these incidental noise sources are incorporated into the foregoing calculations of noise exposure.

Operation of the Secondary Retail uses depicted in the Preliminary Development and Land Use Plan will involve use of daytime deliveries using smaller trucks and vans. Separate loading docks and fork lift vehicle usage are not included as part of these smaller Secondary Retail uses. Noise exposures from delivery operation at these uses will therefore not approach any of the threshold levels outlined above.

Rooftop Mechanical Equipment (HVAC)

The mechanical systems for the proposed big-box stores (Pads A-C) are expected to consist primarily of packaged rooftop units. Based on the mechanical equipment needs for the proposed building sizes, utilizing information from studies of supercenters, home improvement centers and other big-box uses prepared by Bollard Acoustical Consultants, Inc., and calculation procedures outlined in *Noise Control for Buildings and Manufacturing Plants (Hoover & Keith, Inc., 1981)*, the predicted unmitigated rooftop mechanical equipment noise exposure levels at the nearest existing noise-sensitive receivers to the west (approximately 700 feet west of Pad A, 1,600 feet west of Pad B, and 2,600 feet west of Pad C) would be approximately 62 dB Hourly L_{eq}. Again, this level represents unmitigated noise exposure at the closest residences to the west of the project. Because distances from these pads to the noise-sensitive receivers to the east are considerably greater (as outlined above), the noise exposure will be less. Operation of the smaller Secondary Retail uses scattered throughout the Project site will involve use of smaller rooftop units, the noise exposure from which will be substantially less.

As calculated, unmitigated project-related rooftop mechanical equipment noise exposure at the closest existing noise-sensitive receivers to the west of the project site are expected to marginally exceed the applicable daytime noise exposure threshold of 55 dB Hourly L_{eq}. However, paragraphs 10 and 11 of Specific Plan Design Guidelines Section 6.5(d) call for the use of building parapets to screen all such roof-mounted equipment. In order to be effective in reducing off-site noise exposure at the nearest noise-sensitive receivers, these building parapets must be 4-6 feet high. Together with the building roof lines and intervening project building shielding, the parapets would provide for no less than 10 dB of noise attenuation, resulting in HVAC noise exposure of no more than 52 dB Hourly L_{eq} during maximum daytime operations. Nighttime operations of rooftop mechanical systems operating in connection with a 24-hour supercenter use and other facilities requiring nighttime equipment operation would produce less noise less than daytime operations, because of lower average system demands. The resulting noise exposure is not expected to exceed the established 45 dB Hourly L_{eq} threshold at the closest noise-sensitive receivers to the west.

Based on incorporation of the foregoing mitigation measure, noise exposure from rooftop mechanical systems planned as part of the proposed project is expected to comply with the City's noise exposure limits, and is not expected to produce a significant impact on noise-sensitive receivers.

Cumulative Noise Exposure from On-Site Noise Sources

Project-related noise exposure during peak-activity daytime and nighttime hours – including maximum parking lot, truck movement, loading dock, and rooftop mechanical equipment operations in association with all three big-box uses and other Secondary retail uses – would not be expected to exceed 55 dB Hourly L_{eq} (daytime), and 45 dB Hourly L_{eq} (nighttime) thresholds at the closest existing noise-sensitive receivers. Therefore, noise exposure associated with daily operations on the project site is not expected to result in a significant noise impact.

Project Construction

During the construction phases of the project, noise from construction equipment would be expected to add to the noise environment in the immediate project vicinity. Activities involved in construction would likely generate maximum noise levels, as indicated in Table 7, ranging from 85-88 dB at a distance of 50 feet. These unmitigated construction noise levels have been reviewed and verified by Bollard Acoustical Consultants, Inc., as reliable based on other recent developments involving use of modern equipment. Construction activities would be temporary in nature and are anticipated to occur during normal daytime working hours (7 a.m.-6 p.m.). Still, existing noise-sensitive receivers located along the east side of the project site will likely be affected by this noise.

Noise would also be generated during the construction phases by increased truck traffic on local area roadways. A significant project-generated noise source would be truck traffic associated with the transport of heavy materials and equipment to and from the construction site.

TABLE 7

CONSTRUCTION EQUIPMENT NOISE LEVELS

Type of Equipment	L_{max}, dB at 50 feet
Bulldozers	87
Heavy Trucks	88
Backhoe	85
Pneumatic Tools	85

Source: Environmental Noise Pollution, Patrick R. Cunniff, 1977.

SPECIFIC IMPACTS AND MITIGATION STATEMENTS

Impact 1: Increase in Off-Site Traffic Noise Due to the Project

The project would generate increased traffic on existing local area roadways. As shown in Table 6, the project-related traffic (shown in the Existing Plus Project column) would be expected to result in traffic noise level increases as high as 12 dB compared to the Existing (Baseline) condition.

An increase in traffic noise exposure would be expected on Sandy Lane and Live Oak Avenue south of Main Street/Highway 4. However, there are no noise-sensitive land uses located on Sandy Lane or Live Oak Avenue between Main Street/Highway 4 and Oakley Road. These areas are occupied by existing commercial uses adjoining Main Street, and agricultural uses extending south to Live Oak Avenue. Therefore the noise exposure within this area would be **less-than-significant**. Sandy Lane currently terminates at Oakley Road. There are, however, residential uses along Live Oak Avenue between Oakley Road and Laurel Road. The project-related noise exposure increases at noise-sensitive uses in this area would (as shown in Table 6) measure 5.2 dB, and would therefore be **significant.**

Mitigation 1a

Construction of property line noise barriers along Live Oak Avenue between Oakley Road and Laurel Road may be used to mitigate the project-related traffic noise increase in this area. Construction of 6-foot high noise barriers relative to the closest building pad elevations would produce no less than 5 dB of insertion loss (noise reduction) for adjacent residential uses.

Impact after Mitigation 1a

The project-related noise exposure increase could be mitigated completely in this case. Therefore, the resulting project-related noise exposure increase would be **less-than-significant.**

Mitigation 1b

The Oakley 2020 General Plan does not identify sound walls as the preferred method of mitigation where other feasible measures are available. In addition, the construction of property line sound walls will not achieve sufficient noise reduction at locations where the adjoining homes have driveway openings to permit access to Live Oak Avenue. As an alternative to sound walls, rubberized asphalt may be used to mitigate project-related traffic noise exposure increases at existing noise-sensitive receiver locations along Live Oak Avenue between Oakley Road and Laurel Road.

Evaluation of Rubberized Asphalt Noise Mitigation Measure Effectiveness:

One means of reducing overall traffic-related noise levels along Live Oak Avenue would be to install a rubberized asphalt pavement or open gap pavement. Studies conducted for the Sacramento County Department of Environmental Review and Assessment and Transportation Department to determine the noise reduction provided by rubberized asphalt have been completed in recent years. Those studies indicate that the use of rubberized asphalt on Sacramento County roadways appears to have resulted in an average traffic noise level reduction of approximately 4 dB over that provided by conventional asphalt.

The European Commission Green Paper, published in the June 1997 edition of Noise/News International, cites the following on Page 87:

ALow-noise porous road surfaces have been the subject of much research. These porous road surfaces reduce both the generation and propagation of noise by several mechanisms - which can be related to the open structure of the surface layer. Results have shown that the emission noise levels can be reduced from levels generated on equivalent non-porous road surfaces by between 3-5 dB on average; by optimizing the surface design, larger noise reductions are feasible. At present, the cost of porous asphalt surfacing is higher than conventional surfaces (for resurfacing, but for new roads, the cost is minimal), but may drop as contractors gain experience with porous surfaces.@

The use of noise-reducing paving materials for the impacted area of Live Oak Avenue would be a feasible means of achieving a 3-5 dB decrease in traffic noise to a **less-than-significant** level. This measure requires that the developer prepare plans for approval by the City Engineer, and install noise-reducing paving materials prior to completion and operation of any of the big-box uses in the project.

Impact after Mitigation 1b

Project-related traffic noise exposure increases after mitigation along Live Oak Avenue between Oakley Road and Laurel Road would likely be approximately 0-2 dB for the Existing + Project condition. Given the significance threshold of +5 dB in this case, the resulting noise impact would be **less-than-significant.**

Impact 2: Cumulative (2030) Traffic Noise Level Increases

Cumulative (2030) traffic increases with the proposed Specific Plan Project, both with and without the Highway 160 connector ramps, will result in noise increases compared to the Existing (Baseline) condition, as presented in Table 6. Several of the cumulative noise level increases are expected to exceed the threshold standards for significance with or without the Project. The project’s contribution to each such cumulative noise level increase would be less than 5.0 dB where the combined noise level is under 60 dB, less than 3.0 dB where the combined level is between 60 and 65 dB, and less than 1.5 dB where the combined level is over 65 dB. In addition, the volume of traffic generated by the Project is less than that which was analyzed in the Oakley 2020 General Plan EIR (see Appendix C). Application of cumulative mitigation measures identified in the General Plan EIR will therefore serve to mitigate the project’s contribution to all cumulative condition effects. Therefore, this impact would be **less-than-significant.**

Mitigation 2

No additional mitigation required.

Impact 3: Cumulative Noise Exposure at Existing Noise-Sensitive Receivers

Cumulative noise exposure from on-site noise sources associated with operation of the completed Project, including maximum parking lot, truck movement, and loading dock operations in association with the big-box uses and other Secondary retail uses, would not be expected to exceed the thresholds of 55 dB Hourly L_{eq} and 45 dB Hourly L_{eq} during the daytime and nighttime hours, respectively, at the closest existing noise-sensitive receivers. There exists the potential for rooftop mechanical equipment, operating in combination with other on site noise sources, to exceed these thresholds as discussed above, resulting in a **significant impact.**

Mitigation 3

Roof mounted equipment shall be screened in accordance with Specific Plan Sections 6.5(d)(10 and 11) by building roof or parapet elements which extend to a height above the equipment (generally between 4 and 6 feet high). The use of secondary screens or false walls for screening is disallowed.

Impact after Mitigation 3

Cumulative noise exposure to nearby noise-sensitive receivers from all on site sources associated with operation of the completed Project, after mitigation, would likely be less than 55 dB Hourly L_{eq} during daytime hours and less than 45 dB Hourly L_{eq} during nighttime hours, and therefore would be **less-than-significant.**

Impact 4: Noise Exposure to Proposed Hotel (Pad T)

Cumulative (2030) + Project noise exposure at the proposed Hotel building would not be expected to exceed the City's 65 dB L_{dn} exterior noise exposure criterion based on our traffic noise assessment (see Table 6). Based on the estimated exterior noise exposure, interior noise exposure from local transportation noise sources would not likely exceed the City's 45 dB L_{dn} limit. Building Codes currently require compliance with this interior noise exposure standard. Therefore, this impact would be **less-than-significant.**

Mitigation 4

None Required.

Impact 5: BNSF Railway Overpass

The Project proposes to complete a partial extension of Live Oak Avenue, in preparation for a future overpass of the BNSF railroad right-of-way, as called for in the Oakley 2020 General Plan. Future traffic on this elevated roadway is not expected to produce significant noise exposure at the closest noise-sensitive properties to the east (more than 3,000 feet away), or to the nearest noise-sensitive receivers to the east (approximately 2,500 feet away). Therefore, this impact would be **less-than-significant.**

Mitigation 5

None Required.

Impact 6: Construction Noise

Activities associated with the Project construction will result in elevated noise levels, with maximum noise levels ranging from 85-88 dB at 50 feet as shown in Table 7. Although these levels would be audible at the nearest existing residences, they would be temporary in nature and would likely occur during normal daytime working hours. Nonetheless, because construction activities would result in periods of elevated noise levels, this impact would be **potentially significant.**

Mitigation 6

All construction activities shall adhere to all applicable provisions of the City of Oakley Noise Ordinance and applicable Oakley 2020 General Plan mitigation measures. Construction activities shall be limited to 7 a.m. to 6 p.m. Monday-Friday, and 8 a.m. to 5 p.m. Saturday. No construction shall occur on Sunday. All internal combustion engines shall be fitted with factory specified mufflers, and should be in good working order. The project contractor(s) shall locate equipment staging areas as far as possible from existing noise-sensitive receivers to the east and west of the Project site.

Impact after Mitigation 6

Construction noise exposure to nearby noise-sensitive receivers, after mitigation, would be **less-than-significant.**

Appendix E

Biological Assessment Report

BIOLOGICAL ASSESSMENT FOR THE CLINE SPECIFIC PLAN AREA, CONTRA COSTA COUNTY, CALIFORNIA

November 12, 2003

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The information provided in this document is intended solely for the use and benefit of Richard T. Loewke, AICP, and the City of Oakley.

No other person or entity shall be entitled to rely on the services, opinions, recommendations, plans or specifications provided herein, without the express written consent of Wood Biological Consulting, 65 Alta Hill Way, Walnut Creek, CA 94595.

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SUMMARY

This report presents the results from a reconnaissance-level habitat assessment for special-status wildlife and plant species for the Cline Property Specific Plan project site in the City of Oakley, California. This report is intended to provide background and site-specific information pertaining to biological resources and to identify permitting issues and potential constraints to future implementation of the land uses as shown in the proposed Preliminary Development and Land Use Plan. It includes a discussion of the existing plant communities, wildlife associations, potentially-occurring special-status plant and wildlife species and natural communities.

Special-status plant species include those listed as Endangered, Threatened, Rare, or as Candidates for listing by the U.S. Fish and Wildlife Service (USFWS 1995, 1996), the CDFG (1999), and the CNPS (Skinner and Pavlik 1999). The CNPS listing is sanctioned by the CDFG and serves essentially as their list of "candidate" plant species. No special-status natural communities (i.e., wetlands) are present on site and thus no potential impacts to these communities would result from future development of the site.

Twenty-nine special-status plant species are known to occur in the project region. No special-status plant species are considered to have a potential to occur within the specific plan area. Focused surveys for special-status plant species are not warranted.

Nineteen special-status vertebrates have been recorded in the project region. None are considered to have a potential to occur within the specific plan area. Twenty-one special-status invertebrates are known to have historically occurred, or currently occur in the general vicinity of this project site. None is considered to have a high or moderate potential to occur in the study area. Future development of the site is not expected to adversely impact these species. Focused surveys for special-status plant species are therefore not warranted.

Focused surveys for special-status plant or animal species are also not warranted at this time. However, development of the site could result in impacts to migratory birds, which are protected under the Migratory Bird Treaty Act, as well as to burrowing owls which are protected by the CDFG as a special-status species. These are potentially significant impacts which may be reduced to a less-than-significant level through incorporation of the mitigation measures listed in Section 5.3 below.

1.0 INTRODUCTION

This report presents the results from a reconnaissance-level habitat assessment for special-status wildlife and plant species within the 76.4-acre Cline Property Specific Plan area (SPA), located in the City of Oakley, Contra Costa County, California (Figure 1). This report is intended to provide background and site-specific information pertaining to biological resources and to identify permitting issues and potential constraints to future development of the SPA. It includes a discussion of the existing plant communities, wildlife associations, potentially-occurring special-status plant and wildlife species, natural communities, and conclusions.

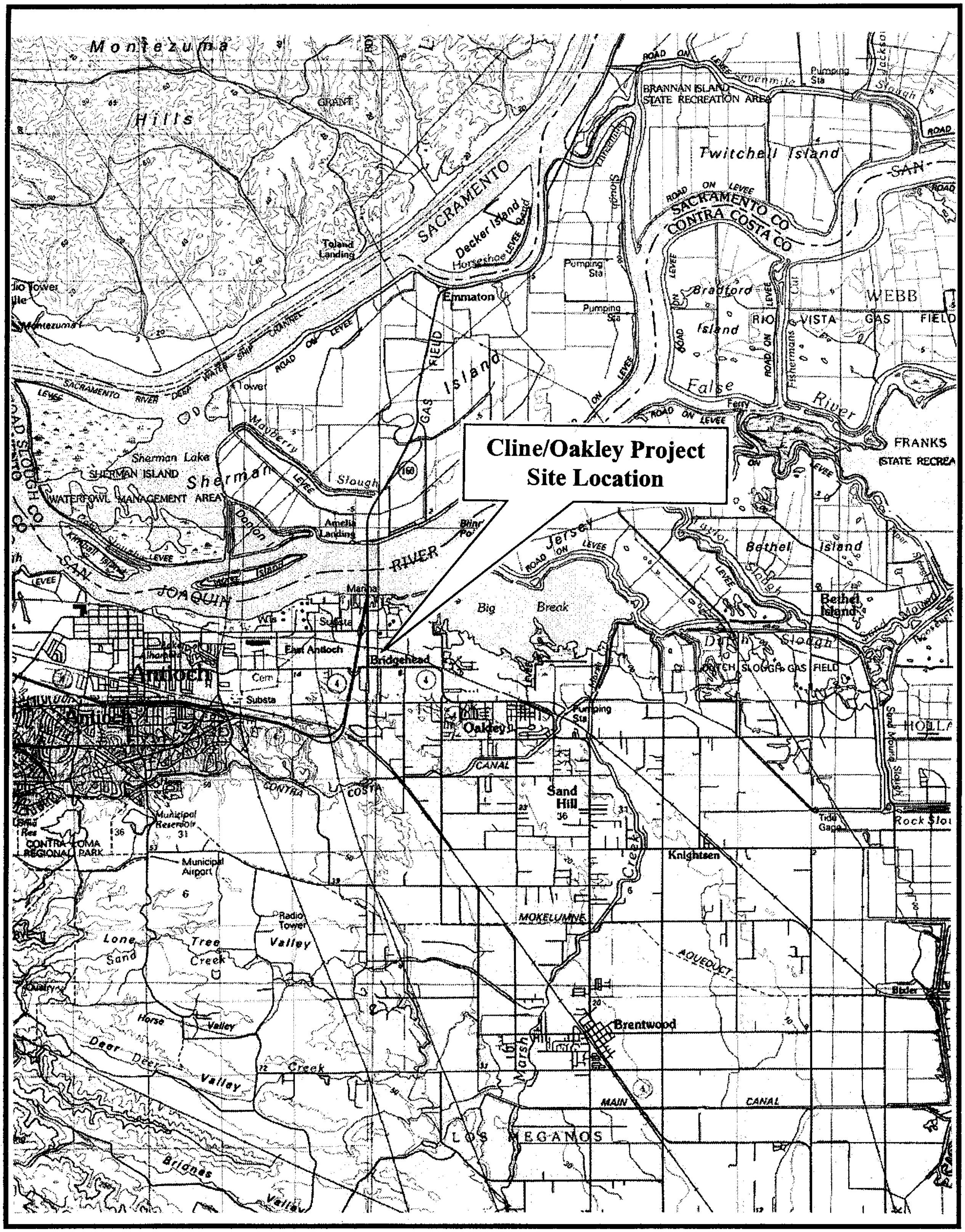
2.0 METHODS AND LIMITATIONS

The findings for this biological constraints report are based on the following: 1) a print-out for the Antioch North, Antioch South, Jersey Island and Brentwood 7.5 minute quadrangles from the California Natural Diversity Database (CNDDB 2003), 2) assessment of habitat types and surrounding land use completed by reviewing recent aerial photographs, and 3) reconnaissance-level surveys by biologists.

A general habitat assessment was conducted by biologists Mike Wood and Autumn Garrett of Wood Biological Consulting on August 8, 2003. Wildlife biologist Trish Tatarian of Wildlife Research Associates conducted an assessment of wildlife habitats on August 4, 2003 to assess the site's potential to host special-status animals. Dick Arnold of Entomological Consulting Services, Ltd. conducted a habitat assessment for special-status invertebrates on September 1, 2003. These surveys were intended only as reconnaissance-level site visits to identify habitat types and to assess the potential for the presence of special-status species within the study area. Focused special-status plant or animal surveys were not conducted as part of these efforts. No indicators of wetland habitat were observed during the reconnaissance surveys; consequently formal wetland delineation was not performed as part of this study.

Surveys were conducted on foot during daylight hours; the entire perimeter of the study area, and all distinct habitats were visited and described. Dominant plant species for each plant community were recorded and the site was surveyed for any potential drainages or wetlands. All wildlife species observed were also recorded. This survey was intended only as a reconnaissance-level evaluation of habitats and to assess the potential for the presence of special-status species. Focused special-status plant or animal surveys were not conducted as part of this effort.

Information on special-status plant species was compiled through a review of the California Natural Diversity Data Base (CNDDB 2003), the California Native Plant Society's *Electronic Inventory of Rare and Endangered Vascular Plants of California* (CNPS 2003), the California Department of Fish and Game's (CDFG) *Special Plants* (CDFG 2003a), *State and Federally Listed Endangered, Threatened, and Rare Plants of California* (CDFG 1999a), the U.S. Fish and Wildlife Service's (USFWS)



Cline/Oakley Project Site Location

Figure 1. Site Location

WOOD
Biological
Consulting

NORTH

Scale 1" = 1.7 miles

Endangered and Threatened Wildlife and Plants (USFWS 1998) and *Endangered and Threatened Plant and Animal Taxa; Proposed Rule* (USFWS 1996). Also reviewed were *Status of Rare, Threatened and Endangered Vascular Plants in Alameda and Contra Costa Counties (and Some Adjacent Areas)* (Olson 1994) and *Unusual and Significant Plants of Alameda and Contra Costa Counties* (Lake 1999).

Information on special-status animal species was compiled through a review of the CNDDB (2003), CDFG's *Special Animals* (CDFG 2003b), *State and Federally Listed Endangered and Threatened Animals of California* (CDFG 2003b), and the USFWS (1996, 2001, 2003).

Nomenclature used in this report conforms to Hickman (1993) for plants. Plant community names conform to Holland (1986) and Sawyer and Keeler-Wolf (1995); wetland community names conforming to Cowardin, *et al.* (1979) are also given where appropriate.

3.0 EXISTING CONDITIONS

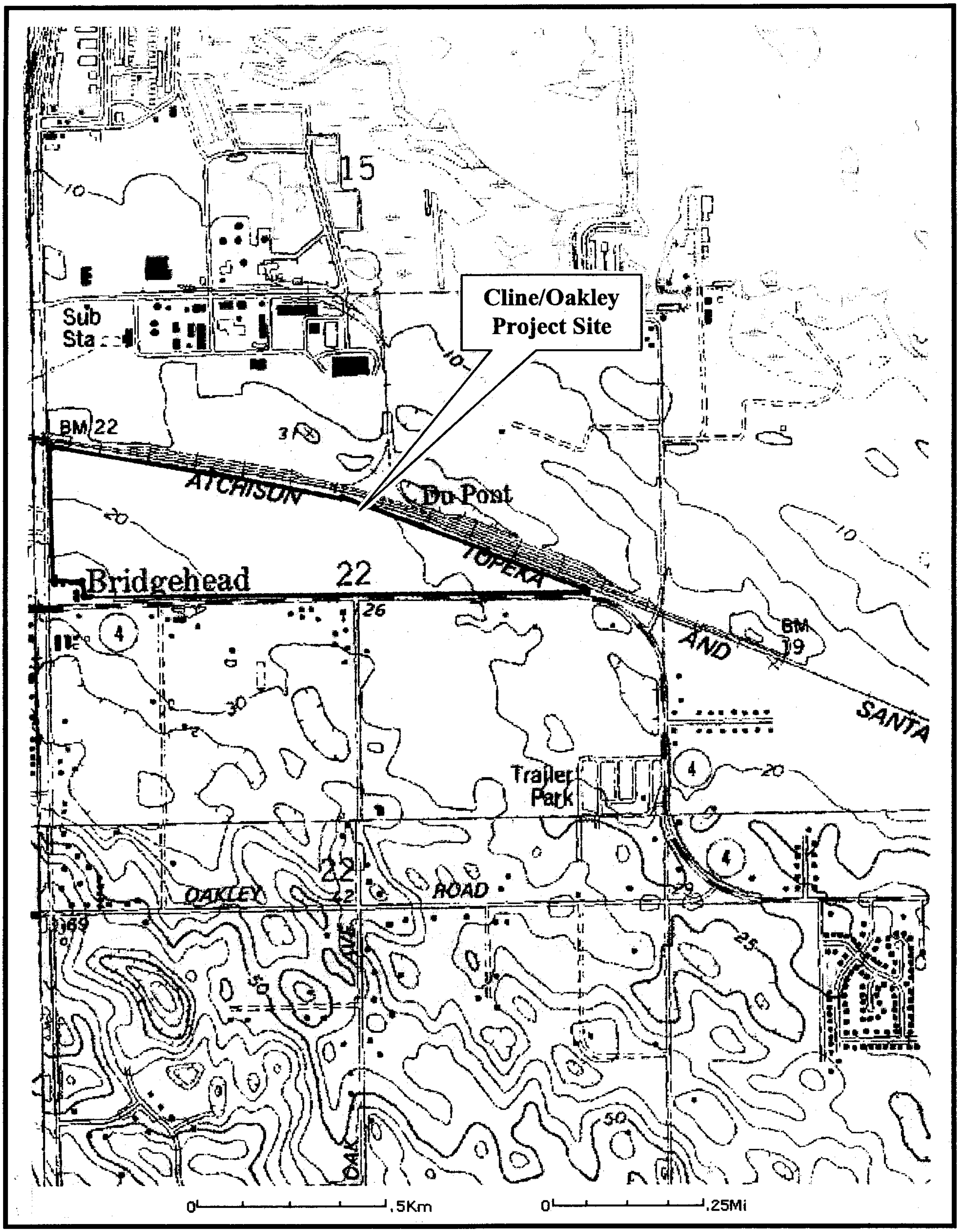
3.1 Setting

The study area covers approximately 76.4 acres and is located on a triangular site north of Highway 4 and immediately east of Bridgehead Road and Highway 160 in Antioch, California (Figures 2 and 3). To the north is the Burlington Northern/Santa Fe Railroad, beyond which lie the former DuPont Chemical Plant and rural/agricultural properties. The southwest corner of Bridgehead Road and Main Street, adjoining the site is commercially developed, with an Arco station and a Caffino café stand. Land on site is dominated by a vineyard, which is bordered on all sides by a dirt road. Also on site are patches of ruderal habitat. One patch is at the southwest corner, adjacent to the commercial area, and a second, linear patch runs alongside the northern boundary of the site.

The Antioch Dunes National Wildlife Refuge (ADNWR) is located approximately 2.2 miles west of the SPA, on the northern side of Wilbur Avenue. This area of stabilized interior dunes consists of extensive wind-blown deposits of sandy soils supporting numerous endemic plant and animal species. In the early part of the 20th century, the Antioch Dunes and much of their unique flora were destroyed by removal of sand for industrial purposes. Relictual portions of the dunes are now under management by the U.S. Fish and Wildlife Service.

3.2 Plant Communities

The study area consists predominantly of actively cultivated vineyards, with the exception of ruderal habitat at the southwest corner and along the northern border, between the dirt road and railroad tracks. Other vegetation includes ornamental trees and shrubs planted alongside Highway 4 and Bridgehead Road, the western and southern borders of the property. The ruderal habitat in the southwest corner sits on clay fill, piles of dirt, and some native sand excavated from elsewhere. Virtually all of the naturally-occurring vegetation on site has been removed by cultivation, grading, disking, and filling. Vegetation communities are described in more detail below.

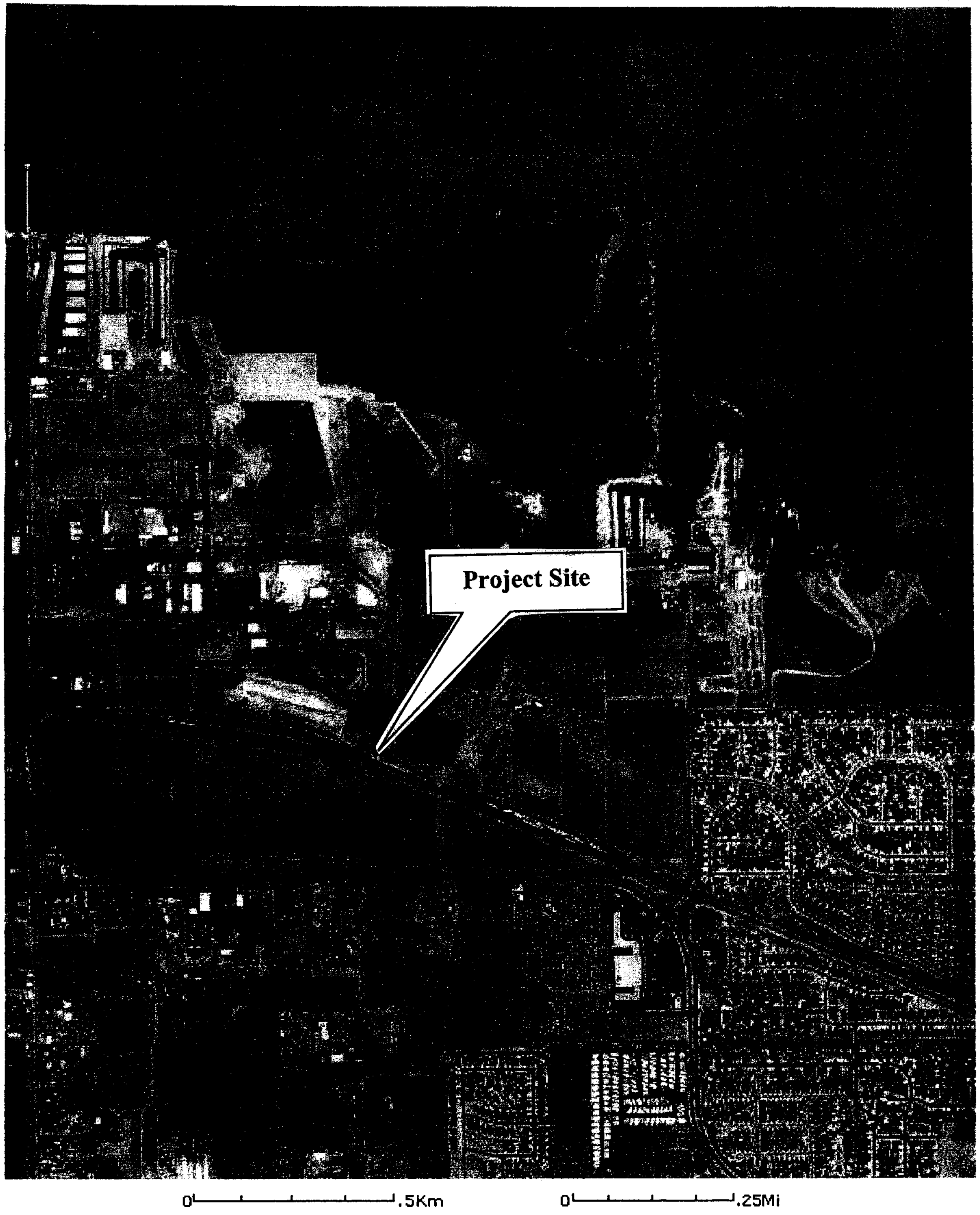


WOOD
Biological
Consulting

Figure 2. Project Vicinity
Topo dated 01 July 1998

NORTH

Scale 1" = 0.25 mile



WOOD
Biological
Consulting

Figure 3. Aerial Photo of Project Vicinity
Photo dated 15 June 1993

NORTH
Scale 1" = 0.25 mile

Disturbed and Cultivated Lands

Disturbed lands are those on which the native vegetation has been completely removed by grading, cultivation, development, and similar activities. Such areas include agricultural fields, orchards, developed areas, paved and unpaved roadways, parking areas, quarries, vacant lots, and storage yards. Such areas are not expected to support any natural vegetation, although invasive non-native and native species may become established where soil is present.

A large portion of the study area is actively cultivated as a vineyard consisting of common grapes (*Vitis vinifera*). Between the rows of vines, vegetation is routinely cleared of weeds. Where the vineyard has not been weeded, a sparse cover of herbaceous, mostly non-native, ruderal grasses and forbs is present.

Ruderal Vegetation and Non-Native Annual Grassland

Ruderal vegetation and non-native annual grassland are intergrading plant communities from which the native vegetation has been completely removed by grading, cultivation, grazing, or other surface disturbances. Such areas, if left undeveloped, may become recolonized by invasive exotic species, as well as by certain native species. The native vegetation may ultimately become at least partially restored if the soils are left intact and there is no continued disturbance.

Within the study area, a majority of the property has been subject to cultivation and grading, and the level of ground disturbance is high. Ruderal vegetation and non-native grassland make up most of the remainder of the site outside of the portions under active cultivation. Characteristic non-native species occurring on site include grasses such as ripgut brome (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), fescue (*Vulpia myuros*) and wild oats (*Avena fatua*), among others. Non-native forbs include yellow star thistle (*Centaurea solstitialis*), smooth cat's-ear (*Hypochaeris glabra*), sour clover (*Melilotus indica*), prickly lettuce (*Lactuca serriola*), filaree (*Erodium botrys*), hoary mustard (*Hirschfeldia incana*), bur-clover (*Medicago polymorpha*), common knotweed (*Polygonum arenastrum*) and many others. Native species detected on site include panicled willowherb (*Epilobium brachycarpum*), deerweed (*Lotus scoparius*), croton (*Croton californicus*) and annual lupines (*Lupinus nanus, L. succulentus*).

Within the study area, soils are sandy and probably represent remnants of interior dunes similar to the Antioch Dunes. However, based on the high degree of surface and soil disturbance within the study area, the potential for occurrence of any species endemic to the Antioch Dunes is considered to be low to none. Widespread species representing possible remnants of the Antioch Dunes formation and present on site include California broom (*Lotus scoparius*) and croton (*Croton californicus*). Both of these native species are fairly common in the region on highly disturbed sandy soils.

Ruderal habitat is not specifically described by Sawyer and Keeler-Wolf (1995), but portions of this habitat would correspond to the California annual grassland series. These habitats would be classified as upland following Cowardin, *et al.* (1979).

3.3 Wildlife Habitats

Wildlife species expected on site are those typically associated with cultivated lands and ruderal vegetation. Although the same native sandy soils that occur at the Antioch Dunes NWR (an area that supports the last remaining populations of endemic invertebrate and vertebrate species for this portion of the Bay-Delta area), are present at the SPA, the study area has been highly disturbed from historic agricultural practices.

Review of the USGS topographic maps and aerial photos reveal the site has been in agricultural production either as an orchard or a vineyard for a period in excess of 50 years. Remnant almond trees can be seen along the perimeter and throughout the existing vineyard. Vegetation around the perimeter of the site, particularly along the Burlington Northern/Santa Fe Railroad (BN/SF RR), is primarily ruderal, and includes non-native grasslands.

Ruderal

Occurring within the southwest corner of the site, ruderal vegetation is made-up of non-native grasses and herbs and provides little habitat for wildlife species. Passerines (perching birds) may use the area for foraging, but are not expected to use the area for nesting, based on the lack of suitable canopy cover and escape from predators. California ground squirrels (*Spermophilus beecheyi*) and Botta’s pocket gopher (*Thomomys bottae*) often move into areas with ruderal vegetation. However, no ground squirrels or evidence of gophers were observed on site.

Vineyards

Vineyards and orchards offer the least overall habitat value of all agricultural crops, mostly because of farming practices. Generally, in the cultivation of vineyards, all herbaceous ground cover is removed beneath the vines and between the rows, as is the case on the SPA. Although some wildlife species forage in vineyards, these lands are thought to be a "second choice" for most species and are unusable by some species, such as larger mammals, for foraging or refuge.

Some reptile species, such as western fence lizard (*Sceloporus occidentalis*) and side-blotched lizard (*Uta stansburiana*), may be associated with this habitat along the perimeter in the ruderal vegetation. Some raptors such as red-shouldered hawk (*Buteo lineatus*), American kestrel (*Falco sparverius*), and barn owl (*Tyto alba*) may use the area for foraging, depending on the cover crops, vine-row spacing, and small mammal control methods used. Other birds associated with cultivated lands such as vineyards may include fruit and insect eating species such as European starling (*Sturnus vulgaris*), Brewer’s blackbird (*Euphagus cyanocephalus*), house finch (*Carpodacus mexicanus*) and northern mockingbird (*Mimus polyglottus*). Other species, such as mourning dove (*Zenaida macroura*) and killdeer (*Charadrius vociferus*), may use the adjacent open sandy areas for nesting if the disturbance level associated with the vineyard is low.

If ground cover is available, rodents such as California vole (*Microtus californicus*) and pocket gophers, and small mammals such as brush rabbit (*Sylvilagus bachmanii*), may forage on the leaves and grasses of vineyards and, in turn, may attract predators such as hawks. Vineyards are known foraging grounds for aerial and ground foraging insect-eating bat species such as myotis (*Myotis* spp.) and pallid bat (*Antrozous pallidus*). Other mammalian species known to use vineyards include raccoon (*Procyon lotor*), skunk (*Mephitis mephitis*), and opossum (*Didelphius virginiana*). However, these species only use vineyards for foraging.

3.4 Wildlife Movement Corridors

Wildlife movement includes migration (*i.e*., usually one way per season), inter-population movement (*i.e*., long-term genetic flow) and small travel pathways (*i.e.*, daily movement corridors within an animal's territory). While small travel pathways usually facilitate movement for daily home range activities, such as foraging or escape from predators, they also provide connection between outlying populations and the main corridor, permitting an increase in gene flow among populations.

These linkages among habitat types can extend for miles from primary habitat areas and occur on a large scale throughout California. Habitat linkages facilitate movement between populations located in discrete areas and populations located within larger habitat areas. The mosaic of habitats found within a large-scale landscape results in wildlife populations that consist of discrete sub-populations comprising a large single population, which is often referred to as a meta-population. Even where patches of pristine habitat are fragmented, such as occurs with coastal scrub, the movement between wildlife populations is facilitated through habitat linkages, migration corridors and movement corridors. Depending on the condition of the corridor, genetic flow between populations may be high in frequency, thus allowing high genetic diversity within the population, or may be low in frequency. Potentially low frequency genetic flow may lead to complete isolation and, if pressures are strong, potential extinction.

The SPA, which is located approximately 2.2 miles to the west, is separated from the Antioch Dunes NWR by extensive industrial and residential development. Because of this densely suburban development, no surface connection between these two sites providing for wildlife movement is expected. The vineyards may provide a wildlife movement corridor for large mammals and birds moving west to east or vice versa. The surface streets of Highway 4 and associated residential development act as an effective barrier to north-south movements for smaller species.

4.0 SPECIAL-STATUS BIOLOGICAL RESOURCES

4.1 Special-status Natural Communities

Special-status natural communities are those that are considered rare in the region, support special-status plant or wildlife species, or receive regulatory protection (*i.e.*, §404 of the Clean Water Act and/or the CDFG §§1600, *et seq.* of the California Fish and Game Code). In addition, the CNDDB has designated a number of communities as rare; these communities are given the highest inventory priority (Holland 1986, CDFG 2003d).

The study area supports no communities that are considered of special status. Stabilized interior dunes, including the Antioch Dunes complex, are considered by the CNDDB to be special-status natural communities (Holland 1986, CDFG 2003d). Although the sandy soils at the study area may have similar origins to the Antioch Dunes to the northwest, a lack of connectivity, as well as the high level of ground disturbance within the study area diminishes the value of the habitat available on site. As such, it is not expected that any part of the study area would be classified as dune habitat.

4.2 Special-status Plant Species

Special-status plant species include those listed as Endangered, Threatened, Rare, or as Candidates for listing by the U.S. Fish and Wildlife Service (USFWS 1995, 1996), the CDFG (1999), and the CNPS (Skinner and Pavlik 1999). The CNPS listing is sanctioned by the CDFG and serves essentially as their list of "candidate" plant species.

Based on a review of special-status plant species in Contra Costa County (CNDDB 2003, Skinner and Pavlik 1999), a total of 29 special-status plant species were considered to have at least some potential to occur in the project region. Based on a reconnaissance-level survey of the study area and an assessment of the available habitats on site, none of the target special-status plant species are considered to have any potential for occurrence within the study area as the site lacks suitable habitat. A summary of the status, habitat affinities, reported localities in the project area, blooming period, and potential for occurrence within the project area for each of the target plant species is presented in Appendix A. An explanation of all sensitivity status codes is provided in Appendix C.

4.3 Special-status Animal Species

Special-status animal species include those listed as Endangered, Threatened, Rare, or as Candidates for listing by the USFWS (1996, 1998) and/or CDFG (2003b). Other species regarded as having special-status include special animals, as listed by the CDFG (2003b). Additional animal species receive protection under the Bald Eagle Protection Act and the Migratory Bird Treaty Act (16 U.S.C. 703-711). The Fish & Game Code of California provides protection for “fully protected birds” (§ 3511), “fully protected mammals”(§ 4700), “fully protected reptiles and amphibians” (§ 5050) and “fully protected fish” (§ 5515). The California Code of Federal Regulations (Title 14) prohibits the take of Protected amphibians (Chapter 5 §41), Protected reptiles (Chapter 5 §42) and Protected furbearers (Chapter 5

§460). Additional definitions are given in the California Environmental Quality Act Section 15380(d).

Special-status wildlife species not addressed in this report include those that are strictly associated with northern coastal salt marsh habitat present in the Bay-Delta, a habitat that is not present within the project area. These species include California clapper rail (*Rallus longirostris obsoletus*), saltmarsh yellowthroat (*Geothlypis trichas sinuosa*), Suisun song sparrow (*Melospiza melodia maxillaris*), San Pablo song sparrow (*Melospiza melodia samuelis*), Suisun shrew (*Sorex ornatus sinuosus*), saltmarsh vagrant shrew (*Sorex vagrans halicoetes*), ornate saltmarsh shrew (*Sorex ornatus salicornicus*) and salt marsh harvest mouse (*Reithrodontomys raviventris*). The San Joaquin kit fox (*Vulpes macrotis mutica*) is not addressed in this report based on the isolation of the site from known locations further south.

Based on the California Natural Diversity Data Base (CNDDB 2003) and our understanding of the geographic range and habitat affinities of special-status animals, a total of 40 special-status animal species were considered to have potential to occur within the study area. A summary of the formal status, habitat affinities, reported localities to the project vicinity, and potential for occurrence within the project area for each of the target animal species is presented in Appendix B. An explanation of all sensitivity status codes is provided in Appendix C. Below is a description of those species pertinent in today's regulatory environment and their potential for occurrence.

Vertebrates

The **silvery legless lizard** (*Anniella pulchra pulchra*), a federal Species of Concern and California Special Concern species, is associated with sandy soils with sparse vegetative cover. Soil moisture is critical for this species and may limit the distribution of the species. The local abundance and geographic distribution of this species is poorly understood for this region. Although two sightings of silvery legless lizards were reported in 2000 at the ADNWR (USFWS 2001), it is highly unlikely that this species occurs on the Cline property based on the intense agricultural practices. Areas that have been disturbed by agricultural practices or other human uses, such as plowing or bulldozing, apparently become inhospitable to legless lizards (Jennings and Hayes 1994). The presence of non-native plant species also reduces the potential for the species to occur because often the non-native species, such as eucalyptus trees, alter the soil moisture or substrate so that the area becomes inhospitable to the species. For these reasons, silvery legless lizard is considered to have no potential for occurrence on site.

The **California horned lizard** (*Phrynosoma coronatum frontale*), a federal Species of Concern and California Special Concern species, is associated with sandy soils, and preys upon native ant species. This species was last observed in the ADNWR in 1977 (USFWS 2001). Surveys conducted in 1982 revealed only two lizard species extant in the ADNWR, side-blotched lizards and western fence lizards. The agricultural practices within the study area preclude the presence of California horned lizard.

California tiger salamander (*Ambystoma californiense*), a federally proposed Threatened species, and a California species of concern, spend most of the year as adults underground in the burrows of ground squirrels and other small animals feeding on insects (Stebbins 1985). Adult salamanders are nocturnal and emerge for only a few weeks per year from their underground retreats. Following heavy winter rains (normally December-February) adults emerge briefly to lay their eggs in seasonal wetlands, slow moving streams, ponds, and ephemeral pools, preferring rain pools, alkali sinks or cattle troughs that have muddy bottoms or contain some algal growth in the water for hiding in, but which are devoid of fish. Agricultural and urban development has eliminated much of the former habitat of this species (Stebbins 1985). Agricultural practices within the study area preclude the presence of this species.

Western burrowing owl (*Athene cunicularia*), is a federal species of concern and is currently being petitioned for listing as Threatened with the CDFG. Like other raptors and birds in general, the western burrowing owl is protected under California Fish and Game Code 3503.5 and the federal Migratory Bird Treaty Act. The burrowing owl is a small, long-legged owl, with dull brown plumage that is barred and spotted with white. Burrowing owls are typically observed on the ground, at or near a burrow, or on elevated areas such as dirt mounds or fence posts that are used as observational or hunting perches. Burrows are the essential component of burrowing owl habitat (CDFG 1995, CBOC 1993) and are often the limiting factor in occupied habitat (Zarn 1974). Burrows used by burrowing owls are usually dug in loose soil by small mammals, such as California ground squirrel, and are enlarged by the owls for nesting. Other structures used for nesting include burrows located under slabs of concrete, railroad ties, wood debris piles, and other anthropogenic features (CBOC 1993, Tatarian, personal observations). Although no individuals, signs or burrows of a suitable size were observed on site, even near the NB/SF RR, there is a moderate potential for this species to occur on site.

Passerines observed on site, such as mocking birds and mourning doves, may nest in the few remaining walnut trees that are located around the perimeter of the study area and within the vineyard, as well as the oleander bushes lining the southern boundary of the project site, on site. There is a high potential for occurrence of nesting passerines within these trees and bushes.

Invertebrates

The project site is situated in a geographic area that historically supported numerous special-status invertebrate taxa. Twenty-one special-status invertebrates are known to have historically occurred, or currently occur in the general vicinity of this project site. These species include 18 insects, one snail, and two crustaceans (Arnold 2003). Species are addressed here for one or more of the following reasons:

a) the site is located within or near the geographic ranges of the species;
b) species are associated with particular soil types present on site;
c) species are associated with plant communities that could occur at the site.

Historical records for all of the species included in the invertebrate assessment indicate that they have been observed in northeastern Contra Costa County or nearby areas (in particular a number of taxa indigenous to the Antioch Dunes, which is located approximately 2 miles northwest of the Cline property). Most of these species are associated either with sand-based terrestrial or freshwater aquatic habitats in the Delta area.

All of the target invertebrate taxa have status only at the federal level, as invertebrates are generally not recognized as rare or endangered by the State of California. Nonetheless, all of the 21 invertebrates would satisfy the criteria of a rare species as defined by the California Environmental Quality Act (CEQA).

None of these invertebrates are considered to have a high or moderate potential to occur in the study area. Future development of the site is not expected to adversely impact these species. Focused surveys for special-status plant species are not warranted.

A summary of the formal status, habitat affinities, reported localities to the project vicinity, and potential for occurrence within the project area for each of the target animal species is presented in Appendix B. An explanation of all sensitivity status codes is provided in Appendix C. Below is a description of those species pertinent in today's regulatory environment and their potential for occurrence.

Lange's Metalmark Butterfly (*Apodemia mormo langei)*. The project site was visited during the flight period of this endangered butterfly, but no individuals were observed. Because its larval food plant, *Eriogonum nudum* ssp. *auriculatum*, is absent from the site, there is no potential for occurrence of this species on site.

San Joaquin Dune Beetle (*Coelus gracilis*). This species burrows in the sand of well-developed sand dunes. Sand was briefly sifted in a few portions of the site, but no specimens of this beetle were found. Based on the degraded habitat conditions at the property, the potential for occurrence of this species is considered to be low.

Curved-foot *Hygrotus* Diving Beetle (*Hygrotus curvipes*). No aquatic habitat was observed at the project site, thus this beetle could not survive there. The project site is a short distance from the type locality in Oakley. There is no potential for the occurrence of this species on site.

Molestan Blister Beetle (*Lytta molesta*). This species is associated with grassland habitats and adults are found on various wild flowers or flowers of native shrubs. The sandy soils are potential areas where the ground-nesting bees, that the beetle parasitizes, would likely nest. However, no burrows of ground-nesting bees known to serve as hosts for the beetle were found on site. Because the native vegetation at the site has been converted to agricultural and is dominated by introduced species, the potential for occurrence of this species considered to be low.

Delta June Beetle (*Polyphylla stellata*). This species has been observed in the Sacramento area in riparian-savanna situations on sandy soils. Related species are known to feed on the roots of oaks. No individuals of coast live oak (*Quercus agrifolia*) are present on site. The species is not considered to have any potential for occurrence on site.

Ciervo Aegialian Scarab Beetle (*Aegialia concinna*). A limited focus survey was performed for this beetle by sifting sand at a few locations on the property, and no beetles were observed. Because of the continued agricultural activities, it is doubtful that the Ciervo Aegialian scarab beetle occurs at the project site.

Anthicid Beetles (*Anthicus antiochensis* and *A. sacramento*). Both species have been found at other small sand deposits, including dredge spoils. Sand was sifted at a few locations on site, but no anthicid beetles were found. However, due to the presence of loose sand at the SPA, there is a low to moderate potential for occurrence of both anthicid beetles on site. Neither of these species has any formal status as a protected species; impacts would not be regarded as significant.

Andrenid Bees (*Perdita hirticeps luteocincta* and *P. scitula antiochensis*). Historical records indicate that these sand dune indigenous bees are active in early fall. However, no andrenids were observed during the September 1 site visit. These species are known to visit the flowers of various native plants, especially *Eriogonum nudum* and *Gutierrezia,* which were not observed at the project site. These species are considered to have no potential for occurrence on site due to a lack of favored food plants and the high level of disturbance to the soil surface.

Sphecid Wasps (*Eucerceris ruficeps* and *Philanthus nasalis*). Both of these species are associated with sand dunes, a habitat type that is not present at the property. Therefore, neither species has potential to occur on site.

Antioch Mutillid Ant (*Myrmosula pacifica*). This species is probably a synonym of a more widespread mutillid. Thus, this species may not be as unique as was originally believed. None were found on site and its potential to occur on site is considered to be low.

Robberflies (*Cophura hurdi*, *Efferia antiochi*, and *Metapogon hurdi*). There are three robberfly species associated primarily with sand dunes, a habitat type that does not occur at the property. The sandy soils on site are probably too disturbed to support any of these three species; these species are considered to have no potential for occurrence on site.

Katydids (*Idiostatus middlekauffi* and *Neduba extincta*). Two species of katydid were formerly found at the Antioch Dunes, but neither has been seen for several decades. *Neduba extincta* is known from only a single specimen. *Idiostatus middlekauffi* was associated with various native dune shrubs. Although likely to occur in the area, the potential for occurrence on site is considered to be low due to the lack of native plant communities.

Bridges Coast Range Shoulderband Snail (*Helminthoglypta nickliniana bridgesii*). This snail prefers to hide under downed branches or logs, or in crevices in boulders and rock outcrops. Since these types of habitats are not present on site, this snail has no potential to occur on site.

Vernal Pool and Mid-Valley Fairy Shrimp (*Branchinecta lynchi* and *B. mesovallensis*). No vernal pools, swales, or other seasonally ponded wetlands normally inhabited by these fairy shrimp are located at the site. these species are considered to have no potential for occurrence on site.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Special-status Natural Communities

There are no special-status natural communities on the project site, and thus no potential impacts to these communities. Therefore, no focused surveys (*e.g.*, wetland delineation, habitat mapping) or mitigation recommendations are warranted.

5.2 Special-status Plant Species

Of the 29 special-status plant species expected in the project region, none is considered to have a high or moderate potential to occur within the SPA due to the highly altered nature of the site. Significant impacts to special-status plant species resulting from development of the site are highly unlikely. Focused botanical surveys are not warranted.

5.3 Special-status Animal Species

Of the 40 special-status animal species expected in the project region, none is considered to have a high potential to occur within the SPA due to the highly altered nature of the site. Significant impacts to special-status plant species resulting from development of the site are highly unlikely. Focused wildlife surveys are not warranted.

Although no special-status vertebrates are considered likely to occur on site, there are two potential impacts to birds that warrant consideration.

Potential Impact 1: The proposed project could result in the removal of potential passerine nesting habitat in the trees and bushes on site, although no focused surveys for nesting passerines have been conducted within the project area. Disturbance during the nesting season may result in the potential nest abandonment and mortality of young. *This is a less-than-significant impact with the following mitigation measures incorporated.*

Mitigation Measure: To avoid "take" and/or further evaluate presence or absence of passerines, the following measures are recommended:

- Tree and bush removal shall be conducted outside the nesting season, which occurs between approximately February 1 and August 15. If removal before

February 1 is infeasible and groundbreaking must occur within the breeding season, a qualified biologist shall conduct a pre-construction nesting bird survey of the trees and bushes. If no nesting birds are observed no further action is required and removal may occur within one week of the survey to prevent “take” of individual birds that may have begun nesting after the survey.

- If birds are observed on site after February 1 it will be assumed that they are nesting on site or adjacent to the site. If nesting birds are observed, ground breaking shall be delayed until after the young have fledged, as determined by bird surveys by a qualified biologist, or until after the nesting season as described above.

- The CDFG Central Coast Regional office allows grading to occur if nesting birds are observed on site, providing that a 75-100 foot buffer zone is created around the observed nest.

Potential Impact 2: If grading or ground disturbance will occur during or after the winter months, the on-site conditions may change, which could attract burrowing owl to the site. Although no burrowing owls, sign of owls, or burrows were observed during the site reconnaissance, grading/filling could result in the removal of potential burrowing owl nesting habitat along the perimeter of the site. Disturbance during either the winter or nesting season may result in the potential take of adults, nest abandonment and mortality of young. *This is a less-than-significant impact with the following mitigation measures incorporated.*

Mitigation Measure: To avoid “take” and/or to further evaluate presence or absence of burrowing owl, the following measures are recommended:

- If ground disturbance must occur during the nesting season (February 1 to August 31), a qualified biologist shall conduct a pre-construction nesting burrowing owl survey following CDFG protocols prior to disturbance. Survey protocols include conducting crepuscular (early morning or late evening) surveys. Any active nests shall not be disturbed until the young have fledged.

- All burrows containing active nests shall be identified by flagging and be protected by a no disturbance buffer zone of 75 meters (approximately 250 feet). On-site habitat loss shall be mitigated through payment of the applicable ECCCHCP fee, as adopted by the City of Oakley. Payment of this fee is required for all phases of the Cline Property Specific Plan project, regardless of whether nesting burrowing owls are identified.

- Areas of bare ground or with grass less than six inches in height may attract burrowing owls during the winter season. If construction is to occur after a period of construction inactivity and the soil is left barren, a habitat evaluation to determine burrowing owl occupancy of the site should be conducted prior to ground disturbance the following season.

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APPENDIX A

POTENTIALLY-OCCURRING SPECIAL-STATUS PLANT SPECIES AT THE CLINE SPECIFIC PLAN AREA

Wood Biological Consulting

Potentially-occurring Special-status Plant Species At The Cline Specific Plan Area

FAMILY *Scientific Name* Common Name	Status		Habitat Affinities And Reported Distribution	Blooming Time Life Form	Potential For Occurrence On Site
Apiaceae - Carrot Family					
Lilaeopsis masonii Mason's lilaeopsis	Federal State CNPS	(FSC) SR 1B 2-3-3	Occurs in marshes and swamps, riparian scrub, freshwater marsh..	Apr-Nov Perennial Herb (rhizomatous)	None: no suitable habitat present.
Asteraceae - Sunflower Family					
Cirsium Crassicaule slough thistle	Federal State CNPS	(FSC) 1B 3-3-3	Occurs in chenopod scrub, marshes and swamps, riparian scrub, freshwater marsh, shadscale scrub..	May-Aug Annual/perennial Herb	None: no suitable habitat present.
Cirsium hydrophilum var. *hydrophilum* Suisun thistle	Federal State CNPS	FE 1B 3-3-3	Occurs in marshes and swamps, coastal salt marsh..	Jul-Sep Perennial Herb	None: no suitable habitat present.
Lasthenia conjugens Contra Costa goldfields	Federal State CNPS	FE 1B 3-3-3	Occurs in cismontane woodland, playas, valley and foothill grassland, vernal pools (moist).	Mar-Jun Annual Herb	None: no suitable habitat present.
Symphyotrichum lentum Suisun Marsh aster	Federal State CNPS	(FSC) 1B 2-2-3	Occurs in marshes and swamps, freshwater marsh..	May-Nov Perennial Herb (rhizomatous)	None: no suitable habitat present.
Psilocarphus brevissimus var. *multiflorus* Delta woolly-marbles	Federal State CNPS	 4 1-2-3	Occurs in vernal pools. (vernally-flooded).	May-Jun Annual Herb	None: no suitable habitat present.

Wood Biological Consulting

Potentially-occurring Special-status Plant Species At The Cline Specific Plan Area

FAMILY *Scientific Name* Common Name	Status		Habitat Affinities And Reported Distribution	Blooming Time Life Form	Potential For Occurrence On Site
Psilocarphus tenellus var. *globiferus* slender woolly-heads	Federal State CNPS		Occurs in coastal strand. (vernally-flooded).		Low: marginally suitable habitat present. Site is too highly altered.
Blepharizonia plumosa ssp. *plumosa* big tarplant	Federal State CNPS	(FSC) 1B 3-3-3	Occurs in valley and foothill grassland.	Jul-Oct Annual Herb	None: no suitable habitat present.
Isocoma arguta Carquinez goldenbush	Federal State CNPS	(FSC) 1B 3-3-3	Occurs in valley and foothill grassland, valley grassland..	Aug-Dec Shrub	None: no suitable habitat present.
Boraginaceae - Borage Family					
Cryptantha hooveri Hoover's cryptantha	Federal State CNPS	(FSC) 1B 2-2-3	Occurs in valley and foothill grassland, valley grassland..	Apr-May Annual Herb	Low: marginally suitable habitat present. Site is too highly altered.
Plagiobothrys hystriculus bearded popcorn-flower	Federal State CNPS	(FSC) 1A *	Occurs in valley and foothill grassland, vernal pools, valley grassland. (moist).	Apr-May Annual Herb	None: no suitable habitat present.
Brassicaceae - Mustard Family					
Erysimum capitatum ssp. *angustatum* Contra Costa wallflower	Federal State CNPS	FE SE 1B 3-3-3	Occurs in inland dunes..	Mar-Jul Perennial Herb	Low: marginally suitable habitat present. Site is too highly altered.

Potentially-occurring Special-status Plant Species At The Cline Specific Plan Area

Wood Biological Consulting

FAMILY *Scientific Name* Common Name	Status	Habitat Affinities And Reported Distribution	Blooming Time Life Form	Potential For Occurrence On Site
Tropidocarpum capparideum caper-fruited tropidocarpum	Federal (FSC) State CNPS 1A *	Occurs in valley and foothill grassland.	Mar-Apr Annual Herb	None: no suitable habitat present.
Campanulaceae - Bellflower				
Downingia pusilla dwarf downingia	Federal State CNPS 2 1-2-1	Occurs in valley and foothill grassland, vernal pools, foothill woodland, valley grassland. (moist).	Mar-May Annual Herb	None: no suitable habitat present.
Legenere limosa legenere	Federal (FSC) State CNPS 1B 2-3-3	Occurs in vernal pools. (vernally-flooded).	Apr-Jun Annual Herb	None: no suitable habitat present.
Chenopodiaceae - Goosefoot				
Atriplex cordulata heartscale	Federal (FSC) State CNPS 1B 2-2-3	Occurs in chenopod scrub, meadows, valley and foothill grassland, shadscale scrub.	Apr-Oct Annual Herb	None: no suitable habitat present.
Atriplex coronata var. *notatior* San Jacinto Valley crownscale	Federal FE State CNPS 1B 3-3-3	Occurs in playas, valley and foothill grassland, vernal pools, alkali sink. (vernally-flooded, alkaline, alkaline). Recorded from Riverside county.	Apr-Aug Annual Herb	None: no suitable habitat present.
Atriplex depressa brittlescale	Federal (FSC) State CNPS 1B 2-2-3	Occurs in chenopod scrub, meadows, playas, valley and foothill grassland, vernal pools, alkali sink, shadscale scrub.	May-Oct Annual Herb	None: no suitable habitat present.
Atriplex joaquiniana San Joaquin spearscale	Federal (FSC) State CNPS 1B 2-2-3	Occurs in chenopod scrub, meadows, playas, valley and foothill grassland, shadscale scrub.	Apr-Oct Annual Herb	None: no suitable habitat present.

Wood Biological Consulting

Potentially-occurring Special-status Plant Species At The Cline Specific Plan Area

FAMILY *Scientific Name* Common Name	Status		Habitat Affinities And Reported Distribution	Blooming Time Life Form	Potential For Occurrence On Site
Fabaceae - Legume Family					
Lathyrus jepsonii var. *jepsonii* Delta tule pea	Federal State CNPS	(FSC) 1B 2-2-3	Occurs in marshes and swamps, freshwater marsh..	May-Sep Perennial Herb	None: no suitable habitat present.
Geraniaceae - Geranium Family					
Erodium macrophyllum round-leaved filaree	Federal State CNPS	 2 2-3-1	Occurs in cismontane woodland, valley and foothill grassland, foothill woodland.	Mar-May Annual Herb	None: no suitable habitat present.
Lamiaceae - Mint Family					
Scutellaria lateriflora blue skullcap	Federal State CNPS	 2 3-2-1	Occurs in meadows, marshes and swamps, freshwater marsh. (moist).	Jul-Sep Perennial Herb (rhizomatous)	None: no suitable habitat present.
Malvaceae - Mallow Family					
Hibiscus lasiocarpus rose-mallow	Federal State CNPS	 2 2-2-1	Occurs in marshes and swamps, freshwater marsh..	Jun-Sep Perennial Herb (rhizomatous), Emergent	None: no suitable habitat present.
Onagraceae - Evening Primrose					
Oenothera deltoides ssp. *howellii* Antioch Dunes evening-primrose	Federal State CNPS	FE SE 1B 3-3-3	Occurs in inland dunes..	Mar-Sep Perennial Herb	Low: marginally suitable habitat present. Site is too highly altered.

11/12/2003

Wood Biological Consulting

Potentially-occurring Special-status Plant Species At The Cline Specific Plan Area

FAMILY *Scientific Name* Common Name	Status		Habitat Affinities And Reported Distribution	Blooming Time Life Form	Potential For Occurrence On Site
Papaveraceae - Poppy Family					
Eschscholzia Rhombipetala diamond-petaled California poppy	Federal State CNPS	(FSC) 1B 3-3-3	Occurs in valley and foothill grassland, valley grassland..	Mar-Apr Annual Herb	None: no suitable habitat present.
Potamogetonaceae - Pondweed					
Potamogeton zosteriformis eel-grass pondweed	Federal State CNPS	 2 2-2-1	Occurs in marshes and swamps, freshwater marsh..	Jun-Jul Annual Herb, Aquatic	None: no suitable habitat present.
Ranunculaceae - Buttercup Family					
Ranunculus lobbii Lobb's aquatic buttercup	Federal State CNPS	 4 1-2-3	Occurs in cismontane woodland, north coast coniferous forest, valley and foothill grassland, vernal pools, foothill woodland, redwood forest, valley grassland. (moist).	Feb-May Annual Herb, Aquatic	None: no suitable habitat present.
Scrophulariaceae - Figwort Family					
Cordylanthus mollis ssp. *mollis* soft bird's-beak	Federal State CNPS	FE SR 1B 3-2-3	Occurs in marshes and swamps, coastal salt marsh..	Jul-Nov Annual Herb, Hemiparasitic	None: no suitable habitat present.
Limosella subulata Delta mudwort	Federal State CNPS	 2 2-3-1	Occurs in marshes and swamps, freshwater marsh. (wet).	May-Aug Perennial Herb (stoloniferous)	None: no suitable habitat present.

APPENDIX B

POTENTIALLY-OCCURRING SPECIAL-STATUS ANIMAL SPECIES AT THE CLINE SPECIFIC PLAN AREA

Potentially-occurring Special-status Animal Species At The Cline Specific Plan Area

Nov 12, 2003

Sort by: **Class**

Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Potential For Occurrence On Site
Gastropoda - Snails And Slugs			
Helminthoglypta nickliniana bridgesi Bridges' Coast Range shoulderband snail	Federal (FSC) State Other DFG: Special Animal	Inhabits open hillsides tall grasses and weeds. Prefers to hide under downed branches or logs, or in crevices in boulders and rock outcrops. Recorded from Alameda, Contra Costa counties.	None: no suitable habitat present.
Branchiopoda			
Branchinecta lynchi vernal pool fairy shrimp	Federal FT State Other DFG: Special Animal	Inhabits small, clear-water sandstone-depression astatic rain-filled pools and grassed swales, earth slumps, or basalt-flow depression pools. Endemic to the grasslands of the Central Valley, Central Coast and South Coast mountains. Recorded from Alameda, Butte, Calaveras, Contra Costa, El Dorado, Fresno, Glenn, Kings, Madera, Merced, Monterey, Napa, Placer, Riverside, Sacramento, San Benito, San Joaquin, San Luis Obispo, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Ventura, Yuba counties.	None: no suitable habitat present.
Branchinecta mesovallensis midvalley fairy shrimp	Federal (FSC) State Other DFG: Special Animal	Inhabits vernal pools. Recorded from Fresno, Merced, Sacramento counties.	None: no suitable habitat present.
Insecta - Insects			
Apodemia mormo langei Lange's metalmark butterfly	Federal FE State Other DFG: Special Animal	Inhabits stabilized dunes. Primary host plant is Eriogonum nudum var. auriculatum. Feeds on nectar of other wildflowers, as well as host plant. Endemic to Antioch Dunes. Recorded from Contra Costa County.	None: no suitable habitat present.
Aegialia concinna Ciervo aegilian scarab beetle	Federal (FSC) State Other BLM: Sensitive DFG: Special Animal	Inhabits sandy substrates. Recorded from Fresno County.	Low: no suitable habitat present. Site has been significantly

Potentially-occurring Special-status Animal Species At The Cline Specific Plan Area

Nov 12, 2003

Wood Biological Consulting

Sort by: **Class**

Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Potential For Occurrence On Site
Anthicus antiochensis Antioch Dunes anthicid beetle	Federal State Other	Known to occupy small sand deposits, including dredge spoils. Recorded only from the Antioch Dunes. Recorded from Contra Costa County.	Low: marginally suitable habitat present.
Anthicus sacramento Sacramento anthicid beetle	Federal (FSC) State Other DFG: Special Animal	Known to occupy small sand deposits, including dredge spoils. Restricted to sand dune areas of the Sacramento-San Joaquin River Delta. Recorded from Sacramento, Solano counties.	Low: marginally suitable habitat present.
Coelus gracilis San Joaquin dune beetle	Federal (FSC) State Other BLM: Sensitive DFG: Special Animal	Burrows in the sand of well-developed sand dunes. Inhabits fossil dunes on sandy substrates. Occurs along the western edge of San Joaquin Valley. Extirpated from Antioch Dunes (type locality). Recorded from Contra Costa, Fresno, Kings counties.	Low: no suitable habitat present. Site has been significantly altered.
Cophura hurdi Antioch cophuran robberfly	Federal State Other	Associated primarily with sand dunes. Known from a single specimen collected in Antioch. Recorded from Contra Costa County.	None: no suitable habitat present.
Efferia antiochi Antioch efferian robberfly	Federal (FSC) State Other DFG: Special Animal	Associated primarily with sand dunes. Known only from Antioch and Fresno. Recorded from Contra Costa, Fresno counties.	None: no suitable habitat present.
Eucerceris ruficeps redheaded sphecid wasp	Federal State Other DFG: Special Animal	Nests in hard-packed sand utilizing abandoned halictine bee burrows. Occurs on interior dunes of central California. Recorded from Fresno, Stanislaus counties.	None: no suitable habitat present.
Hygrotus curvipes curved-foot hygrotus diving beetle	Federal (FSC) State Other DFG: Special Animal	Aquatic inhabitant known only from a shallow, muddy pool at Oakley. Recorded from Counties.	None: no suitable habitat present.

Wood Biological Consulting

Potentially-occurring Special-status Animal Species At The Cline Specific Plan Area

Nov 12, 2003

Sort by: **Class**

Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Potential For Occurrence On Site
Idiostatus middlekaufi Middlekauf's shieldback katydid	Federal (FSC) State Other	Associated with various native dune shrubs. Formerly found at the Antioch Dunes, but has not been seen for several decades. Recorded from Contra Costa County.	Low: no suitable habitat present.
Lytta molesta molestan blister beetle	Federal (FSC) State Other DFG: Special Animal	Associated with grassland habitats and adults are found on various wild flowers or flowers of native shrubs. Inhabits the Central Valley. Recorded from Contra Costa, Fresno, Kern, Merced, Tulare counties.	Low: marginally suitable habitat present.
Metapogon hurdi Hurd's metapogon robberfly	Federal (FSC) State Other DFG: Special Animal	Associated primarily with sand dunes.	None: no suitable habitat present.
Myrmosula pacifica Antioch multilid wasp	Federal (FSC) State Other DFG: Special Animal	This species is probably a synonym of a more widespread mutillid. Thus, this species may not be as unique as was originally believed. Recorded from the Antioch Dunes. Recorded from Contra Costa County.	Low:
Perdita hirticeps luteocincta yellow-banded andrenid bee	Federal State Other	Restricted to sand dunes. Active in early fall. Known to visit the flowers of various native plants, especially Eriogonum nudum and Gutierrezia californica. Known only from the Antioch Dunes. Recorded from Contra Costa County.	None: no suitable habitat present.
Perdita scituta antiochensis Antioch andrenid bee	Federal (FSC) State Other DFG: Special Animal	Restricted to sand dunes. Active in early fall. Known to visit the flowers of various native plants, especially Eriogonum nudum, Gutierrezia californica, Heterotheca grandiflora, and Lessingia glandulifera. Known only from Antioch Dunes. Recorded from Contra Costa County.	None: no suitable habitat present.

Potentially-occurring Special-status Animal Species At The Cline Specific Plan Area

Sort by: **Class**

Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Potential For Occurrence On Site
Philanthus nasalis Antioch sphecid wasp	Federal State Other	Associated with sand dunes. Known only from the Antioch Dunes. Recorded from Contra Costa County.	None: no suitable habitat present.
Polyphylla stellata delta June beetle	Federal State Other	Observed in the Sacramento area in riparian-savanna situations on sandy soils. Related species are known to feed on the roots of oaks.	None: no suitable habitat present.
Desmocerus californicus dimorphus Valley elderberry longhorn beetle	Federal FT State Other DFG: Special Animal	Prefers to lay eggs in elderberrry (Sambucus mexicana) stems 2-8 inches in diameter. Some preference is shown for "stressed" elderberries. Occurs only in the Central Valley of California. Recorded from Butte, Colusa, El Dorado, Fresno, Glenn, Kern, Madera, Mariposa, Merced, Napa, Placer, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties.	None: no suitable habitat present.
Amphibia - Amphibians			
Rana aurora draytonii California red-legged frog	Federal FT State Other DFG: CSC	Inhabits lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation. Requires 11-20 weeks of permanent water for larval development. must have access to estivation habitat. Recorded from Alameda, Butte, Contra Costa, Fresno, Los Angeles, Marin, Mendocino, Merced, Monterey, Napa, Placer, Plumas, Riverside, San Benito, San Bernardino, San Francisco, San Joaquin, San Luis Obispo, San Mateo, Santa Barbara, Santa Clara, Santa Cruz, Solano, Sonoma, Stanislaus, Tehama, Ventura, Yuba counties.	None: no suitable habitat present.
Reptilia - Reptiles			
Anniella pulchra pulchra silvery legless lizard	Federal (FSC) State Other DFG: CSC FS: Sensitive (full species)	Inhabits sandy or loose loamy soils under sparse vegetation, on moist. Recorded from Contra Costa, Fresno, Los Angeles, Merced, Riverside, San Benito, San Bernardino, San Diego, San Luis Obispo, Santa Barbara, Ventura counties.	None: no suitable habitat present. Site is too highly altered.

Wood Biological Consulting

Potentially-occurring Special-status Animal Species At The Cline Specific Plan Area

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Sort by: **Class**

Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Potential For Occurrence On Site
Emys marmorata western pond turtle	Federal State Other DFG: CSC	A thoroughly aquatic turtle inhabiting ponds, marshes, rivers, streams and irrigation ditches with aquatic vegetation. Needs basking sites and sandy banks or grassy open fields in upland areas for egg-laying. Recorded from Contra Costa, Fresno, Kings, Madera, Mariposa, Merced, Monterey, Placer, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Solano, Sonoma, Stanislaus, Tulare, Tuolumne counties.	None: no suitable habitat present.
Phrynosoma coronatum California horned lizard	Federal State Other BLM: Sensitive DFG: CSC	Special status conferred to Frontale population. Inhabits a wide variety of habitats. Most common in lowlands along sandy washes with scattered low bushes. Requires open areas for sunning, bushes for cover, patches of loose soil for burial, and abundant supply of ants and other insects. Recorded from Alameda, Contra Costa, El Dorado, Fresno, Kern, Los Angeles, Merced, Monterey, Nevada, Placer, San Benito, San Joaquin, San Luis Obispo, Santa Barbara, Santa Clara, Tulare counties.	None: no suitable habitat present. Site is too highly altered.
Thamnophis gigas giant garter snake	Federal FT State ST Other DFG: Special Animal	Prefers freshwater marsh and low gradient streams. Has adapted to drainage canals and irrigation ditches. This is the most aquatic of the garter snakes in California. Recorded from Butte, Colusa, Contra Costa, Fresno, Glenn, Kern, Merced, Sacramento, San Joaquin, Solano, Sutter, Yolo counties.	None: no suitable habitat present.
Masticophis lateralis euryxanthus Alameda whipsnake	Federal FT State ST Other DFG: Special Animal	Inhabits south-facing slopes and ravines where shrubs form a vegetative mosaic with oak trees and grasses. Restricted to valley-foothill hardwood habitat of the Coast Ranges between Monterey and northern San Francisco Bay. Recorded from Alameda, Contra Costa counties.	None: no suitable habitat present.

Potentially-occurring Special-status Animal Species At The Cline Specific Plan Area

Nov 12, 2003

Sort by: **Class**

Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Potential For Occurrence On Site
Aves - Birds			
Agelaius tricolor tricolored blackbird	Federal State Other DFG: CSC (nesting colony) BLM: Sensitive FWS: BCC USBC: Watch List Audubon: Watch List	Highly colonial species. Requires open water, protected nesting substrate, and foraging areas with insect prey within a few km of the colony. Greatest concentrations are in the Central Valley and vicinity. Largely endemic to California. Recorded from Alameda, Butte, Calaveras, Colusa, Contra Costa, El Dorado, Fresno, Glenn, Humboldt, Kern, Kings, Lake, Lassen, Los Angeles, Madera, Marin, Mendocino, Merced, Modoc, Monterey, Napa, Orange, Placer, Riverside, Sacramento, San Benito, San Diego, San Joaquin, San Luis Obispo, Santa Barbara, Santa Clara, Santa Cruz, Shasta, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Tuolumne, Ventura, Yolo, Yuba counties.	None: no suitable habitat present.
Athene cunicularia burrowing owl	Federal State Other DFG: CSC (burrow sites) FWS: BCC BLM: Sensitive	Inhabits open, dry annual or perenial grasslands, deserts and scrublands characterized by low-growing vegetation. Nests underground in mammal burrows, especially those of California ground squirrel. Recorded from Alameda, Butte, Colusa, Contra Costa, Fresno, Glenn, Imperial, Inyo, Kern, Kings, Lassen, Los Angeles, Madera, Marin, Merced, Monterey, Napa, Orange, Placer, Riverside, Sacramento, San Benito, San Bernardino, San Diego, San Joaquin, San Luis Obispo, Santa Clara, Santa Cruz, Solano, Sonoma, Stanislaus, Sutter, Tehama, Tulare, Ventura, Yolo counties.	Low: marginally suitable habitat present. No suitable nesting habitat present.
Buteo swainsoni Swainson's hawk	Federal State ST Other DFG: Special Animal (nesting) FS: Sensitive FWS: BCC USBC: Watch List Audubon: Watch List	Breeds in stands with few trees in juniper-sage flats, riparian areas and in oak savannah. Requires adjacent suitable foraging areas such as grasslands, or alfalfa or grain fields supporting rodent populations. Recorded from Butte, Colusa, Contra Costa, Fresno, Glenn, Inyo, Kern, Kings, Lassen, Los Angeles, Madera, Merced, Modoc, Mono, Placer, Sacramento, San Bernardino, San Joaquin, Siskiyou, Solano, Stanislaus, Sutter, Tehama, Tulare, Yolo counties.	Low: no suitable habitat present. No suitable nesting habitat present.

Wood Biological Consulting

Potentially-occurring Special-status Animal Species At The Cline Specific Plan Area

Nov 12, 2003

Sort by: **Class**

Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Potential For Occurrence On Site
Riparia riparia bank swallow	Federal State ST Other DFG: Special Animal (nesting)	Nests colonially, primarily in riparian and other lowland habitats west of the desert. Requires vertical banks/cliffs with fine-textured/sandy soils near streams, rivers, lakes, ocean to dig nesting hole. Recorded from Alameda, Butte, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Inyo, Lassen, Modoc, Mono, Monterey, Plumas, Sacramento, San Benito, San Diego, San Francisco, San Luis Obispo, San Mateo, Santa Barbara, Shasta, Siskiyou, Sonoma, Sutter, Tehama, Ventura, Yolo counties.	None: no suitable habitat present.
Asio flammeus short-eared owl	Federal State Other DFG: CSC (nesting) USBC: Watch List Audubon: Watch List	Inhabits both freshwater and salt water swamp lands, lowland meadows, and irrigated alfalfa fields. Tule patches/tall grass needed for nesting/daytime seclusion. Nests on dry ground in depressions concealed in vegetation. Recorded from Contra Costa, Imperial, Los Angeles, Modoc, Monterey, San Mateo, Solano counties.	None: no suitable habitat present.
Charadrius montanus mountain plover	Federal FPT State Other DFG: CSC (wintering) FWS: BCC USBC: Watch List (full species) Audubon: Watch List (full species)	Winters on short grasslands, freshly plowed fields, newly sprouting grain fields, and sometimes sod farms. Prefers short vegetation, bare ground and flat topography, as well as grazed areas and areas with burrowing rodents. Recorded from Fresno, Kern, Los Angeles, Merced, San Benito, Solano, Tulare, Yolo counties.	None: no suitable habitat present.

Potentially-occurring Special-status Animal Species At The Cline Specific Plan Area

Nov 12, 2003

Wood Biological Consulting

Sort by: **Class**

Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Potential For Occurrence On Site
Circus cyaneus northern harrier	Federal State Other DFG: CSC (nesting)	Inhabits coastal salt and freshwater marshes. Nests and forages in grasslands, from salt grass in desert sink to mountain cienagas. Nests on ground in shrubby vegetation, usually at marsh edge. Nests are large mounds of sticks in wet areas. Recorded from Alameda, Butte, Contra Costa, Inyo, Marin, Merced, Monterey, Orange, Riverside, San Diego, San Mateo counties.	None: no suitable habitat present. No suitable nesting habitat present.
Elanus leucurus white-tailed kite	Federal State Other DFG: fully protected (nesting) FWS: MNBMC	Inhabits rolling foothills andvalley margins with scattered oaks and river bottomlands or marshes next to deciduous woodlands. Utilizes open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching. Recorded from Alameda, Colusa, Contra Costa, Del Norte, Marin, Napa, Placer, Riverside, Sacramento, San Diego, San Luis Obispo, San Mateo, Santa Clara, Solano, Sonoma, Tehama, Ventura, Yolo counties.	None: marginally suitable habitat present. No suitable nesting habitat present.
Falco peregrinus anatum American peregrine falcon	Federal delisted State SE Other DFG: fully protected (nesting) CDF: Sensitive FWS: BCC (full species)	Nests near wetlands, lakes, rivers, or other water bodies, on cliffs, banks, dunes, mounds, and human-made structures. Nests consist of a scrape on a depression or ledge in an open site. Recorded from Alameda, Humboldt, Napa, Shasta, Siskiyou, Tehama counties.	None: no suitable habitat present. No suitable nesting habitat present.
Lanius ludovicianus loggerhead shrike	Federal State Other DFG: CSC (nesting) FWS: BCC	Nests in broken woodlands, savannah, pinyon-juniper, Joshua tree, and riparian woodlands, desert oases, scrub and washes. Prefers open country for hunting, with perches for scanning, and fairly dense shrubs and brush for nesting. Recorded from Riverside County.	Low: marginally suitable habitat present.

Wood Biological Consulting

Potentially-occurring Special-status Animal Species At The Cline Specific Plan Area

Nov 12, 2003

Sort by: **Class**

Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Potential For Occurrence On Site
Phalacrocorax auritus double-crested cormorant	Federal State Other DFG: CSC (rookery site)	Nests colonially on coastal cliffs, offshore islands, and along lake margins in the interior of the state. Nests along coast on sequestered islets, usually on ground with sloping surface, or in tall trees along lake margins. Recorded from Alameda, Contra Costa, Del Norte, Humboldt, Lake, Lassen, Mariposa, Monterey, Sacramento, San Diego, San Francisco, Santa Barbara, Sonoma, Ventura counties.	None: no suitable habitat present.
Mammalia - Mammals			
Vulpes macrotis mutica San Joaquin kit fox	Federal FE State ST Other DFG: Special Animal	Inhabits annual grasslands or grassy open stages with scattered shrubby vegetation. Needs loose-textured sandy soils for burrowing, and a suitable prey base. Recorded from Alameda, Contra Costa, Fresno, Kern, Kings, Madera, Merced, Monterey, San Benito, Santa Clara, Tulare counties.	None: no suitable habitat present. No suitable denning habitat present.
Perognathus inornatus inornatus San Joaquin pocket mouse	Federal State Other DFG: Special Animal BLM: Sensitive	Typically found in grasslands and blue oak savannas. Needs friable soils. Recorded from Alameda, Colusa, Contra Costa, Fresno, Kern, Kings, Lake, Los Angeles, Merced, Monterey, San Joaquin, San Luis Obispo, Stanislaus, Sutter, Tehama, Tulare, Ventura counties.	None: no suitable habitat present.

APPENDIX C

EXPLANATION OF SENSITIVITY STATUS CODES

APPENDIX C
EXPLANATION OF SENSITIVITY STATUS CODES

AGENCIES

USFWS = U.S. Fish and Wildlife Service
CDFG = California Department of Fish and Game
CNPS = California Native Plant Society
BLM = Bureau of Land Management
USFS = U.S. Forest Service

CALIFORNIA NATIVE PLANT SOCIETY DESIGNATIONS

List 1: Plants of highest priority
List 1A: Plants presumed extinct in California
List 1B: Plants rare and endangered in California and elsewhere
List 2: Plants rare and endangered in California but more common elsewhere
List 3: Plants about which additional data are needed
List 4: Plants of limited distribution

CNPS R-E-D Codes

R (Rarity)

1 = Rare, but found in sufficient numbers and distributed widely enough that the potential for extinction or extirpation is low at this time.
2 = Occurrence confined to several populations or to one extended population.
3 = Occurrence limited to one or a few highly restricted populations, or present in such low numbers that it is seldom reported.
? = More data are needed

E (Endangerment)

1 = Not endangered
2 = Endangered in a portion of its range
3 = Endangered throughout its range
? = More data are needed

D (Distribution)

1 = More or less widespread outside California
2 = Rare outside California
3 = Endemic to California
? = More data are needed

note: currently, all CNPS list 1B and 2 taxa are considered "Special Plants" by the CDFG.

FEDERAL DESIGNATIONS

FE = listed as Endangered by the Federal Government
FT = listed as Threatened by the Federal Government
FPE = proposed as Endangered by the Federal Government
FPT = proposed as Threatened by the Federal Government
FSS = federal sensitive species, as listed by BLM and USFS
C[1] = Candidate; taxa for which USFWS has sufficient biological information to support a proposal to list as Endangered orThreatened).
SC[1] = Species of Concern
MB = migratory non-game birds of management concern to the USFWS; protected under the Migratory Bird Treaty Act.

[1] As of Feb. 28, 1996, all Category 1 candidate taxa are now regarded merely as Candidates. The USFWS ceased to maintains lists of Category 2 and Category 3 candidate taxa; Category 2 taxa are now regarded as Species of Concern.

CALIFORNIA DEPT. OF FISH AND GAME DESIGNATIONS

CE = Listed as Endangered by the State of California
CR = Listed as Rare by the State of California
CT = Listed as Threatened by the State of California
CPE = Proposed for listing as Endangered
CSC = California Species of Special Concern
* = taxa that are restricted in distribution, declining throughout their range, or associated with habitats that are declining in California.
CFP = Fully protected under the Cal. Fish and Game Code.
CP = Protected Species under Cal. Code of Regulations.
CEQA = taxa which are considered to meet the criteria for listing as Endangered, Threatened or Rare by the CDFG; impacts to such taxa must be addressed in CEQA documents.
CEQA? = Taxa that might be locally significant; should be evaluated for consideration during preparation of CEQA documents, as recommended by the CDFG.

Appendix F

Cultural Resources Assessment

CULTURAL RESOURCE ASSESSMENT REPORT
CLINE PROPERTY SPECIFIC PLAN
OAKLEY, CONTRA COSTA COUNTY, CALIFORNIA

PREPARED FOR:

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Management Summary

William Self Associates, Inc. (WSA) has implemented a record search, archaeological field survey and assessment of a 76.4-acre parcel at the proposed Cline Property Specific Plan project area located on Main Street (State Route 4) in Oakley, Contra Costa County. As the construction project will involve ground disturbance, primarily by cut and fill excavation, a cultural resource study was conducted in compliance with Section 21084.1 of the California Environmental Quality Act (CEQA).

The archival record search for the following project conducted at the Northwest Information Center (NIC) of Sonoma State University on behalf of WSA (File No. 03-209), indicated that there have been 13 previous surveys and 1 recorded prehistoric site within ¼-mile of the project area. The Native American Heritage Commission (NAHC) was contacted in September, 2003 requesting information on any sacred sites within the project area and a listing of interested Native American representatives. No additional information on sacred sites was gathered as a result of this contact.

Field surveys were conducted in order to document any previously unrecorded cultural resources within the Cline Property boundaries. WSA's field surveys were conducted by Eric Strother, B.A., Thomas Young, B.A., and Kyle Brown, M.A. During the survey of the project area (October 1st, 2nd, and 9th, 2003), one previously unrecorded site containing historic and prehistoric artifacts was identified.

Adverse impacts from construction activity would most likely result from encountering additional cultural deposits during project construction. No impacts to cultural resources are anticipated during the operational phase of the project. Proper implementation of the two proposed mitigation measures, including construction personnel training, and archaeological monitoring would reduce the impact to a less-than-significant level.

All materials collected in preparation for this assessment report, including archival materials from the Northwest Information Center (NIC), field survey notes, and photographs, will be stored at the corporate office of William Self Associates, Inc. in Orinda, California.

PROJECT DESCRIPTION AND LOCATION

The proposed Cline Property Specific Plan project area is located on the north side of Main Street (State Route 4) at the City of Oakley's westerly entrance from Highway 160 (Figure 1). The project location is south of BNSF Railroad line and east of Bridgehead Road. The 76.4-acre project site includes Assessor's Parcels 037-040-015 and 037-040-007 but excludes a service station and coffee bar on the northeast corner of Bridgehead Road and Main Street. Development of the Specific Plan project site will involve the construction of a series of one-story commercial buildings (totaling up to 770,000 square feet) and associated parking areas located across the property. The project area, which is currently planted in grapes, is situated in Township 2 North, Range 2 East, in Section 22 of the former Rancho Los Meganos as depicted on the 1978 Jersey Island, California 7.5' USGS topographic quadrangle (Figure 2). The elevation of the property is approximately 13-25 feet above sea level.

ENVIRONMENTAL SETTING

Existing Environment

The Cline Property Specific Plan project area is situated on the western margin of California's Central Valley, one of two principal grassland communities that exist in California (the second being the coastal grassland that covers middle-elevation hillsides from San Francisco to southern Oregon). Together these are known as the Pacific Prairie (Brown 1985:84). The project vicinity, located east of Antioch, comprises a series of low, rolling hills west of the project area that rise in elevation to nearly 300 feet above sea level, and flat expanses on the Project site and to the east toward the Delta.

Annual precipitation in the region varies from six to 29 inches, with precipitation concentrated in the fall, winter, and spring months. This climate is much like that found in the Mediterranean: mild, rainy winters, and hot, dry summers. After the first rain at the end of October or early November, the vegetation becomes green and remains green, but not growing, until late February, when the grasses begin to grow rapidly. By early May, the area has usually changed to dry, golden-colored grasses, and stays that way until fall.

Temperatures in the summer are high, often reaching over 38° C (100° F) (Brown 1985:87). The combination of this climate and the arable soils of the Central Valley have proven irresistible to farmers; the extensive agricultural use of the region has resulted in the disappearance of much of the original grassland community. Grasslands persist, but the dominant species are completely different from those found 150 years ago by settlers (Brown 1985:84).

With some exceptions, however, the flora and fauna have not changed as dramatically in this part of Contra Costa County as in other areas of California. Grazing cattle have prevented the overgrowth of vegetation and trees that would require protective fire control. Common vegetation observed during the survey include: lupine, blue dicks (Brodiaea pulchella), blue bells, mustard (Brassica sp.), common groundsel (Senecio vulgaris), purple sanicle (Sanicula bipinnatifida), yellow fiddleneck (Amsinckia sp.), shepherd's-purse (Capsella Bursa-pastoris), chamomile, cilantro, miner's lettuce (Montaiper foliata), oak (Quercus sp.), buckeye (Aesculus californica), and various other native and imported grasses.

Animal life within the region is diverse. Unlike prehistoric times when animals such as pronghorn, antelope, tule elk, mule and black-tail deer, and grizzly bears occupied the area, today the region favors small, herbivorous mammals – especially voles, pocket gophers, ground squirrels, and pocket mice (Brown 1985:87). The larger, open areas in the vicinity of the Project site attract some larger animals including deer, coyotes, rabbits, skunks, opossum, raccoons, and a number of birds including several types of owls, buzzards, and various raptors.

Paleoenvironment

Most of the western United States was subjected to a series of climatic fluctuations over the past several millennia; the central interior valley portion of California is no exception. Warm/dry episodes were followed by intermittent cool/moist periods (Moratto et al. 1978). The Holocene or Recent Epoch has seen six cool periods followed by five warm periods. The Altithermal period, ending about 2,900 years ago, was a warm/dry episode that apparently had wide-ranging implications throughout the west, leading to changes in animal migrations and plant productivity and distribution. A cooler period followed for the next 1,400 years, followed by yet another warm/dry climate starting about 600 years ago, which remains to the present day.

Native grasses covered the upland environment throughout the area before livestock was introduced to the region in the early 1800s. Although the species of animals inhabiting the Central Valley before the influx of humans is largely known, the type of plants that may have occupied the valley grassland is not as well defined. Purple needlegrass, a bunchgrass found only in California, may have been the dominant grass species. Truly purple in color, purple needlegrass's dried stalks would have lent a distinctive color to the valley grasslands in the summer (Brown 1985:87).

Historic Land Changes

By 1830, agriculture and livestock grazing were established in the area. The arrival and proliferation of cattle and horses constituted one of the principal reasons for the disappearance of the California grasslands (Brown 1985:88). By 1851, wild oats, an introduced species noted as an excellent food source, had become the dominate species in the valleys and foothills of the Mount Diablo area. Today nearly 400 introduced species – mostly annuals that were probably brought inadvertently from the Mediterranean by Spanish explorers – grow in the California grasslands.

Agriculture and the use of extensive irrigation systems have also changed the face of the vegetation in much of the grasslands. Cherries, tomatoes, walnuts, almonds, grapes, and avocadoes are some of the crops now being produced in the land surrounding the project area.

CULTURAL SETTING

Prehistory

Research into local prehistoric cultures began with the work of N. C. Nelson of the University of California at Berkeley, who conducted the first intensive archaeological surveys of the San Francisco Bay region from 1906 to 1908. He was the first person to identify the Bay Area as a distinct archaeological entity. He maintained that the intensive use of shellfish—a subsistence strategy reflected in both coastal and bay shore middens—indicated a general economic unity in the region during prehistoric times (Moratto 1984: 227). Nelson documented more than 100 shellmounds along the bay shore in Alameda and Contra Costa Counties, when the area was still ringed by salt marshes three to five miles wide (Nelson 1909: 322ff.).

In 1911, Nelson supervised excavations at CA-SFR-7 (the Crocker mound) near Hunter's Point, a site later dated to 3,000-1,500 B.P. (years before present)[1]. L.L. Loud identified archaeological components from this same period in Santa Clara County in 1911 while excavating at CA-SCL-1 (the Ponce, Mayfield, or Castro Mound site). R. J. Drake recognized them in San Mateo County in 1941-1942 at CA-SMA-23 (Mills Estate) in San Bruno (Moratto 1984:233).

The work of Nelson and Loud in the Bay Area provided the impetus for investigation into the

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[1] All B.P. dates are calculated from 1950 AD.

prehistory of central California, which began in earnest in the 1920s. Stockton-area amateur archaeologists J.A. Barr and E.J. Dawson excavated a number of sites and made substantial collections in the area from 1893 to the 1930s. On the basis of artifact comparisons, Barr identified what he felt were two distinct cultural traditions. Dawson later refined his work into a series of "Early," "Middle," and "Late" sites (Ragir 1972; Schenck and Dawson 1929).

Professional or academic-sponsored archaeological investigations began in the 1930s when J. Lillard and W. Purves of Sacramento Junior College formed a field school, which conducted excavations throughout the Sacramento Delta area. By means of artifact and burial data they identified a three-phase sequence similar to Barr’s and Dawson's, which they called "Early," "Intermediate," and "Recent" cultures (Lillard and Purves 1936). In 1954, Richard Beasley refined this system and extended it to include the region of San Francisco Bay. The result was referred to as the Central California Taxonomic System (CCTS) (Lillard, Heizer, and Fenenga 1939; Moratto 1984). Subsequently the CCTS system was applied widely to site dating and taxonomy throughout central California

Much of the subsequent archaeological investigation in the Central Valley focused on a refinement of the CCTS through an analysis of environmental change, settlement and subsistence strategy, exchange, population movement, and related topics. These studies established subsequences for many regions of central California. The best received of these studies has been Fredrickson's (1973) concept of cultural "patterns" (Moratto 1984:201-214). His idea was that, in spite of local variations, widespread cultural patterns are identifiable. He described patterns as “adaptive modes,” which extend across one or more regions and are “characterized by particular technological skills and devices, particular economic modes, including participation in trade networks and practices surrounding wealth, and by particular mortuary and ceremonial practices” (Fredrickson 1973:7-8).

Fredrickson’s chronological sequence for central California begins with the Windmiller Pattern, which possesses cultural elements belonging to both the Early and Middle Horizons. Sites from this period date from about 6,950 to 3,950 B.P. Although earlier occupations no doubt existed, sites from the PaleoIndian Period, dating from about 11,950 to 7,950 B.P., are thought to be buried beneath Holocene alluvial deposits and are not well documented in this part of California (Ragir 1972). Some scholars have suggested that Windmiller Pattern sites are associated with an influx of people from outside of California, who introduced subsistence patterns adapted for a riverine-wetlands environment (Moratto 1984:207).

Windmiller Pattern sites are often situated in riverine, marshland, or valley floor settings, as well as atop small knolls above prehistoric seasonal floodplains. Such an area provided a wide variety of plant and animal resources. Most Windmiller Pattern sites have contained burials with remains that are extended ventrally, oriented to the west, and that contain copious amounts of mortuary artifacts. These artifacts often include large projectile points and a variety of fishing paraphernalia—net weights, bone hooks, and spear points. The faunal remains indicate that the inhabitants hunted a range of large and small mammals. Stone mortars and grindstones for seed and nut processing are common finds. Other artifacts—such as charmstones, ochre, quartz crystals, and both *Olivella* and *Haliotis* shell beads—suggest a practice of ceremonialism and trade.

The subsequent Berkeley Pattern (previously included in the Middle Horizon culture) covers a period from about 3,500 to 1,500 B.P. in the San Francisco Bay region. This pattern shares some attributes with the Windmiller Pattern at the beginning of the sequence and with the Late Horizon period at the end. Berkeley Pattern sites are much more common and well documented, and therefore better understood, than Windmiller Pattern sites. These sites are scattered in more diverse environmental settings, but riverine settings are prevalent.

Deeply stratified midden deposits, which developed over generations of occupation, are common to Berkeley Pattern sites. These middens contain numerous milling and grinding stones for food preparation. Projectile points in this pattern become progressively smaller and lighter over time, culminating in the introduction of the bow-and-arrow during the Late Horizon period. Slate pendants, steatite beads, stone tubes, ear ornaments, and burial techniques that utilize variable directional orientation, flexed body positioning, and a general reduction of mortuary goods are unique to Berkeley Pattern sites (Fredrickson 1973:125-126; Moratto 1984:278-279).

The Late Prehistoric Period (formerly the Late Horizon) ranges from about 950 to 150 B.P. This period coincides with Fredrickson's Augustine Pattern, which is typified by intensive fishing, hunting, and gathering (especially acorns), a large population increase, expanded trade and exchange networks, increased ceremonial and social attributes, and the practice of cremation in addition to flexed burials. Certain artifacts are also distinctive in this pattern: bone awls used in basketry, small notched and serrated projectile points that are indicative of bow-and-arrow usage, occasional pottery, clay effigies, bone whistles, and stone pipes. The Augustine Pattern and the Late Prehistoric period are recognized as the apex of Native American cultural development in this part of California.

In 1951, prehistoric burials and artifacts were exposed by heavy equipment operators on the southwestern bank of San Francisquito Creek in Santa Clara County. Dubbed the University Village Site (CA-SMA-77), it was excavated in 1951 and 1952 by G. A. Gerow of Stanford University. The cultural pattern identified was a mixture of Windmiller Pattern traits with materials markedly dissimilar to other Early Horizon period sites. To explain this, Gerow argued for a cultural expression different from that found in the Central Valley, which had been used to define the Windmiller Pattern. Gerow suggested that an Early Bay Culture inhabited the area from 3,400 to 2,900 B.P. that eventually merged with the culture of the Central Valley.

Evidence of even earlier occupation in the Bay Area came to light in 1970 during construction of the Bay Area Rapid Transit system (BART) when workers unearthed a skeleton in San Francisco's Civic Center. W. G. Henn and R. E. Schenk of San Francisco State University examined the skeleton and confirmed through radiocarbon dating that the skeletal remains dated to approximately 5,660 B.P. Further confirmation for early occupation came from Sunnyvale when Bada and Helfman provided radiocarbon dates of about 4,410 ±95 B.P. for charcoal found in association with a skeleton unearthed there.

In 1922, B. Seymour, a student at Stanford University, found a skull eroding out of the bank of San Francisquito Creek. It was located about six meters below the surface and was in primary context. Labeled Stanford Man I, it was dated in 1974 to 5,080 ±70 B.P. (Berger 1974). B. Gerow discovered Stanford Man II, a flexed human skeleton, 1,150 m downstream from Stanford Man I in 1963. Radiocarbon dates for Stanford Man II were 4,350 ±70 B.P. (Berger 1974).

Data recovered from these and other Bay Area sites indicate a widespread but sparsely populated culture of hunters and gatherers in the region as early as 5,660 B.P. (Henn and Schenk 1970; Henn et al. 1972). This culture was replaced around 3,950 B.P. by one adapted to bayshore and marshland habitation. The Berkeley Pattern describes this culture although there is considerable regional variation (Moratto 1984:207-211). Moratto suggests that this replacement culture corresponds to the spread of Utian (Miwok-Costanoan) people from eastern Contra Costa County. By 3,400 B.P., this group had settled in the southern Bay Area. From here they spread northward to the peninsula, westward to the coast, and southward to the Santa Clara Valley. They would remain in these areas until historic times.

By 1920 B.P., the Berkeley Pattern was developing into the Augustine Pattern, with its characteristic bow-and-arrow, tubular tobacco pipe, cremation, intensive acorn utilization, and complicated exchange systems. It was this emerging pattern that was destroyed by the Spanish mission system and subsequent historical developments (Moratto 1984:283).

Ethnography

At the time of historic contact with the Spanish missionaries and explorers, the project area was occupied by the Bay Miwok group of Native Americans. The Bay Miwok spoke a language now considered one of the major subdivisions of the Miwok-Costanoan, which belonged to the Utian family within the Penutian language stock (Shipley 1978: 82-84).

Levy (1978:399) places the Bay Miwok territory from the Suisun Bay to just south of Mount Diablo and from there eastward to the Sacramento-San Joaquin Delta. The tribal group associated with the Antioch area was known as the Chupcan. Levy (1978:401) states that

> On April 3, 1776, members of an exploring expedition visited a village near Antioch. Anza (1930:144) estimated the population of the settlement at 400 persons. The settlement visited probably belonged to the tribelet referred to in the mission books as Chupcan.

Baker and Shoup (1990:4) [citing Bennyhoff (1977) and Milliken (1983)] suggest that the Bay Miwok tribal group living just south of the survey area was probably the Wolwon (also cited as Volvon or Bolbon) people who occupied the upper Marsh Creek drainage east of Mount Diablo.

The time at which the Bay Miwok migrated into this area is disputed. Beeler (1959), who has studied the Saclan language, claims it was originally spoken to the east along the lower courses of the Tuolumne, Stanislaus, and the Mokelumne rivers. He surmises that these people were displaced to the west by a northerly push of the Yokuts, which may have been completed as recently as 300 years ago. This implies the Bay Miwok were in their historical territory only a century or less before the first Spanish explorers arrived in the region (Beeler 1959:68).

Farris, Davis, and McAleer (1988:2), in their analysis of ethnographic and ethnolinguistic data, find some support for this position from scholar William Shipley, who maintains the Yokuts' homeland appears to be in the southern San Joaquin Valley. James Bennyhoff, however, disputes this scenario in a personal communication with Farris, Davis, and McAleer (1984). This raises the question: if the Bay Miwok came into this area only as recently as 300 years ago "...whom did they displace? Was it the Costanoan-speaking peoples, Patwin, or some other group?" (Farris, Davis, and McAleer 1988:2) At present there is no answer to the question of the native occupancy of the area before 300 years ago.

The Miwok comprised a group of people united by language but broken into tribal groups (independent political entities such as the Chupcan and Wolwon), each occupying defined territories over which they controlled access to natural resources. Although each tribal group had one or more permanent villages, their territory contained numerous smaller camp sites used as needed during a seasonal round of resource exploitation.

Extended families lived in domed, conical structures built of thatched grass. Semisubterranean men's houses were built at the larger village sites, also using thatched grass and earth cover (Kroeber 1970). Tule or balsa canoes were used to navigate to and from islands and for hunting and gathering forays into the delta.

Given an abundant and continuous subsistence base, ceremony in Miwok life was fairly extensive, and scholars have written much about it based on early ethnographic accounts (Bennyhoff 1977:11; Kroeber 1970; Levy 1978). Rituals associated with death were of great importance. Two forms of interment were practiced and mortuary goods were often placed into the grave at the time of burial. Cremation was also occasionally practiced.

Scholars have suggested the early California environment offered a large assortment of resources for use by native people, although acorns, fish, and game mammals formed the staples of their diet (Baumhoff 1963). Researchers have stressed that acorns, with various seeds, grasses, nuts, berries, and roots were of utmost importance, as plant food collection and preparation formed the center of Miwok technology (Bennyhoff 1977:10; Kroeber 1970:814-815; Gifford 1916:139-194).

The arrival of the Spanish in the San Francisco Bay Area in 1775 led to the rapid demise of native populations, including the Bay Miwok. Diseases introduced by early expeditions and missionaries killed a large number of local peoples, exemplified by a mass burial of 18 individuals adjacent to the Hotchkiss Mound site near Oakley (Heizer 1954). On an expedition through the Central Valley in 1832-1833, Ewing Young observed:

> In the Fall of 1832....the banks of the Sacramento River, in it's whole course through the valley, were studded with Indian villages....On our return, late in the summer of 1833, we found the valleys depopulated. From the head of the Sacramento to the great bend and slough of the San Joaquin, we did not see more than six or eight Indians; while large numbers of their skulls and dead bodies were to be seen under almost every shade-tree near water, where the uninhabited and deserted villages had been converted into graveyards....(Cook 1955:318).

With abandonment of the mission system and Mexican takeover in the 1840s, numerous ranchos were established. The few remaining Indians were then forced, by necessity, to work for the ranchos. The native lifestyle in much of northern California ceased to exist by the mid-19th century, and most of the native population vanished with it. For further ethnographic information on the Bay Miwok, refer to Levy (1978) and Bennyhoff (1977).

Regional History

The history of northern California, Contra Costa County, and the project area in particular, can be divided into several periods of influence. For the purposes of establishing a historic context from which to assess the potential significance of historic sites in the project area, various periods and local sub-periods, some of which overlap, are defined below.

Due to its location beyond the eastern slope of Mount Diablo, about 30 (air) miles from San Francisco Bay, the project area was largely isolated from the Spanish and Mexican periods of California. Therefore, events associated with the Spanish and Mexican periods, and cultural remains from those periods, are not expected to be reflected in the project area but are discussed briefly as a point of reference:

Spanish Period (in California)	1775 - 1822
Mexican Period	1822 - 1848
American Period	1838 - present

Spanish Period (1775-1822)

The Spanish period in Alta California began in 1775 when Captain Juan Manuel Ayala's expedition explored the San Francisco Bay and ventured up the Sacramento and San Joaquin rivers in search of a suitable mission site. The first mission in the region was established the following year with the completion of Mission San Francisco de Asis (Mission Dolores) in San Francisco. The mission era ensued, lasting over the next 46 years, leading to the establishment of numerous missions and outposts, and the subsequent "missionization" of native groups, which contributed to their decimation due to disease and subjugation.

The earliest historical accounts of the project area come from the Spanish explorers who ventured to Mount Diablo in the late 18th century. Although it is not known if they came into the project area, they must have passed within a few miles of it (Farris, Davis, and McAleer 1988:7). The Anza-Font expedition of 1776 traveled along the southern shore of Suisun Bay until reaching Antioch where they noticed numerous rancherias before turning southeast in an attempt to cross the tule swamps (Cook 1957:135).

Mexican Period (1822-1848)

Under the Spanish, the missions controlled the land. After Mexico seceded from Spain in 1822, land was granted to private citizens, a practice that increased significantly after the 1833 act of the Mexican legislature that established the secularization of the missions. By 1845, the last of the mission land holdings were relinquished, opening the way for the large ranchos common to California in the mid-1800s. Predominant land-use on the ranchos was the raising of livestock and ranching. American explorers, mostly traders and beaver trappers, were also flocking to the west during this time, and their "trail blazing" led to the settlement of the territory. Jedediah Smith, in 1827, led a party of trappers up the Sacramento River from the San Joaquin Delta region, leading to the establishment of the "California-Oregon Road," followed by numerous explorations over the next twenty-five years (Kyle 1990: preface).

Jose Noriega and his wife, Manuela Fenendez, took possession of the Rancho de Los Meganos (sand dunes ranch) soon after their arrival in 1834. The parcel Noriega claimed was four leagues long and three leagues wide (approximately 17,000 acres), extending east from the foot of Mount Diablo to the mouth of the San Joaquin River. No standing architectural remains from this period are known to exist in the area.

Deterioration of relations between the United States and Mexico resulted in the Mexican War, which ended with Mexico relinquishing California to the United States under the Treaty of Guadalupe Hidalgo of 1848. With the formation of the new State of California, and the onset of the American period, rapid changes were in store for the region.

The discovery of gold in the Sierra Nevada in 1848 produced a major population increase in the northern half of California as emigrants sought gold or various jobs producing goods or services for miners. Land use changes resulted as livestock grazed some native grasses to extinction, woodlands were cut for lumber, railroad ties, and mine timbers, and agricultural development occurred on nearly all arable land.

American Period (1838 - present)

In 1836, near the end of the Mexican period, John Marsh arrived in Los Angeles, Alta California. While riding north in search of a place to settle down, he met Jose Noriega. Noriega agreed to accept all of Marsh's money, $500, in exchange for Noriega's Rancho de Los Meganos. Marsh thus became the first Anglo-American to settle in Contra Costa County (Emanuels 1993:204). From 1838 until he built what became known as the "Stone House" in 1856, Marsh lived on the rancho in a small adobe structure. This adobe was apparently located very close to a group of Indians, likely to have been Bay Miwok. Farris, Davis, and McAleer (1988:8) cite a letter from

Abby Tuck Marsh (John Marsh's wife) stating that about twenty Indians lived in huts "a few rods from the door of the adobe" (a rod being 16.5 feet). It is said Marsh moved a village of natives across Marsh Creek to the northwest in order to put the Stone House where he wanted it (site record for CA-CCO-548 by Farris 1987).

When twin brothers William and Joseph Smith moved their families from Massachusetts to California in 1849, John Marsh was there to greet them. Accounts vary somewhat, but it seems clear that shortly after their arrival the brothers were met by Marsh and quickly acquired land, either from Marsh's vast holdings or from an unknown party (Emanuels 1993:216; Slocum & Co. and Munro-Fraser 2000:671; Kyle 1990:64). The brothers were both carpenters and ordained ministers and they quickly found jobs in "New York of the Pacific," today known as Pittsburgh, constructing housing for the flood of migrants coming to California in search of gold. Joseph died of malaria that first winter.

The following summer, William received news that a ship docking in San Francisco was carrying passengers from Maine wanting to settle permanently in California (Kyle 1990:64). He immediately went to greet them and offered each family a lot at Smith's Landing on which to build a home. Approximately half of the families accepted his offer, and the settlement they created was named Antioch at their 1851 Fourth of July picnic (Slocum & Co. and Munro-Fraser 2000:672-3).

On June 24, 1851, Marsh, who was then in his fifties, married Abbie Tuck. She was a devout Baptist living with missionaries near San Jose. He took her to live in his four-room, earthen floor adobe house. In 1854 he hired artisans to build a more permanent and stately structure, later to be known as the Stone House. The cost of the building was about $20,000 (Historic Record Company 1926:381). Abbie Marsh died in August 1855 before the house was finished, leaving behind John Marsh and their young daughter, Alice (Emanuels 1993:204).

On September 24, 1856, Marsh was stabbed to death on the road just outside Martinez by Jose Olivas, Juan Garcia, and Felipe Moreno, three disgruntled employees who felt he had cheated them out of their wages. They overtook his buggy on mustangs while he was traveling to Martinez. They lassoed him, pulled him off his buggy, and then stabbed him to death. His driverless horse and buggy continued on to Martinez where it was spotted by some citizens, who went back and found his body (Historic Record Company 1926:382).

After a series of events, Marsh's rancho was finally acquired by James T. Sanford. According to Emanuels (1993:199) the only noteworthy aspect of Sanford was his sale of a few acres to the San Pablo and Tulare Railroad, thereby defining the land for the village of Brentwood. Sanford, together with John F. Williams, owned all of the Brentwood Coal Company, which also held partial title to the Marsh land. In 1878, Sanford missed his mortgage payments on the Marsh property, and the Savings and Loan Society wasted no time in acquiring it (Emanuels 1993:200).

The Savings and Loan Society of San Francisco kept most of the rancho land for 22 years, renting it out to dry-land farmers. Rent was paid in the form of wheat or barley at a rate between one-quarter to one-third of their crop (Emanuels 1993:200).

On October 23, 1900, a group of Scottish investors, Balfour-Guthrie Investment Company, bought Rancho de Los Meganos from the Savings and Loan Society for $200,799.43. Even though Balfour-Guthrie purchased the land in 1900, it took until 1913 for the firm to obtain a portion of the ranch still owned by the estate of James T. Sanford (a little more than 5.25 percent of the land), which was offered $50,000 for the parcel. At the same time, the company acquired another 500 acres from a Peter G. King (Hohlmayer 1991a).

On September 16, 1912, a permit was issued by the chief of the U.S. Army Corp of Engineers and authorized by the Secretary of War to divert two hundred cubic feet per second of water from Indian Slough, a branch of Old River (which, in turn, was a branch of the San Joaquin River) in Contra Costa County (Hohlmayer 1991a). Balfour-Guthrie spent $500,000 that same year, building an irrigation system to spread water over more than 22,000 acres, including lands near the cities of Brentwood and Knightsen, Discovery Bay to the east, and the town of Oakley to the north.

The development of this irrigation system changed the land use in the area from cattle, grain, and alfalfa production to dairy farms, orchards (walnuts, cherries, almonds, apricots, peaches, and plums), and vineyards (Hohlmayer 1991b). Other crops, such as tomatoes, strawberries, and beans were begun in the 1950s.

RESULTS OF THE RECORDS AND LITERATURE SEARCH

The staff at the California Historical Resources Information System, Northwest Information Center (NIC) at Sonoma State University conducted a record search of the project vicinity on September 30, 2003 (File No. 03-209)(Appendix D). The record search included a review of all cultural resource and excavation reports and recorded archaeological sites within a ¼-mile radius of the project area. The study included a review of archaeological, ethnographic, historical, and environmental literature as well as records and maps on file at the California Archaeological Inventory. No historic resources are shown on the 1910 USGS, Jersey Topographic Quadrangle historic map for the project area (Appendix D). No known cultural resources exist within or directly adjacent to the project area.

Thirteen surveys have been conducted within ¼-mile of the project area (Baker 1990, 1999; Bramlette et al. 1991, Busby 1976; Chavez 1982; Dougherty 1991; Holman 1999; Losee 2001; Moratto et al. 1995; Price 1992; Scott 1999, Werner 1986; West and Welch 1996). As a result of the surveys, one prehistoric site was identified within one quarter mile of, but outside the project area (CA-CCO-135). No other historic or prehistoric cultural resources were located.

CA-CCO-135 was recorded in 1945 by J.J Farrar and W. Wallace. The original location of the site, nearly ¼ mile north of the project area, may have been misplotted, and the site record notes that CA-CCO-135 is probably located on the Bethel Island USGS Quadrangle map. The site reportedly consisted of a prehistoric archaeological deposit with pestle, mortar rim fragment, an antler flaker, a square-cut olivella shell bead, and an obsidian point fragment. The site record indicates that CA-CCO-135 was destroyed by grading.

NATIVE AMERICAN CONSULTATION

On September 29, 2003, Leigh Martin of William Self Associates, Inc. (WSA) contacted the Native American Heritage Commission (NAHC) in writing to request information on known Native American traditional or cultural properties within the project area, and to request a listing of individuals or groups with cultural affiliation to the project area. Debbie Pilas-Treadway from the Native American Heritage Commission responded to the request and indicated that "a search of the sacred lands file has failed to indicate the presence of Native American cultural resources in the immediate project area." No individual or tribal members will be notified as part of this scope of work[2]. The project sponsor may desire to use the list of individuals to solicit comment on the project environmental documentation if desired (see Appendix A for letter dated October 10, 2003, and list of Native American Contacts).

METHODOLOGY AND RESULTS OF THE FIELD SURVEY

Methodology

WSA archaeologist Eric Strother and field technician Thomas Young conducted a pedestrian survey of the project area on October 1st and 2nd, 2003 (refer to Figure 2). A follow-up survey was conducted by WSA Senior Archaeologist Kyle Brown on October 9, 2003. The area was evaluated for the presence of historic or prehistoric site indicators. The archaeological survey

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[2] The provisions of SB 18 regarding tribal consultation do not apply because the Specific Plan project was initiated prior to march 1, 2005.

was conducted using transect intervals of 6-10 meters between the grape rows. The objective of the cultural resource evaluation within the Cline Property was to locate, record, and evaluate the significance of all cultural resources within the proposed project area. Visible ground surface was examined for the presence of historic or prehistoric site indicators, such as charcoal, obsidian or chert flakes, grinding bowls, shell fragments, bone, and pockets of dark, friable soils (for prehistoric sites), and glass, metal, ceramics, brick, wood and similar debris (for historic sites).

Survey Results

The entire 76.4-acre Project site and immediately adjoining property area was surveyed. Ground visibility was excellent due to recent disking of the level agricultural field. Soil throughout the property is described as loosely consolidated yellow silt with few rocks. Trowel or foot clearing was used occasionally to improve soil visibility.

The majority of the project area is flat and open and is currently covered in grape rows (Appendix 1: Photos 1 and 2). The grapes do not appear to have been tended to for some time. Do to the sandy nature of the soil, no other vegetation or weeds grow between the rows or around the grape vines resulting in excellent surface visibility. Recent garbage is scattered on the property adjacent to the road shoulders. The survey resulted in the discovery of a light scatter of prehistoric and historic debris strewn across the majority of the western half of the property. Agricultural disking of the grape vineyard has clearly disrupted the original location and association of the artifacts. A description of the prehistoric and historic finds is included below.

A light scatter (approximately 1-2 pieces per 10 sq meters) of older and more recent bottle glass fragments and shards of white ceramic dishware covers the entire western portion of the property. A more concentrated scatter of historic trash was noted in the northwest portion of the project area, approximately 61 meters south of the railroad tracks and 210 meters east of Bridgehead Road just east of a dirt access road for farm equipment (Figure 3). This scatter (approximately 5 pieces per square meter) measures approximately 30 meters (N-S) by 20 meters (E-W) and consists of burned and unburned bottle glass fragments, and ceramic dishware fragments (Photos 3 and 4). Artifacts include an aqua colored insulator fragment, an aqua bottle top with a hand-laid ring, double bead finish, and possible tooling marks, a machined light green/aqua colored food (pickle sauce) container base, 2 fragments of earthenware with an irregular matte finish, and a fragment of blue-on-blue stoneware.

Other historic items found in this concentration include recent brown beer-bottle glass, fragments of indeterminate burned glass, melted chunks of aluminum, a pipe clamp, and a rusted manifold gasket from an automobile or tractor. Nearly all of the items are highly fragmented from disking of the area, and no diagnostic fragments were found. Based on the design, finish, and coloration of the glass fragments, the observed historic artifacts are estimated to have a wide range of dates from the early 20th Century to the present.

No historic structures are noted in the project area on historic maps. Most of the historic artifacts found on the Cline Property exhibit heat damage, especially near the artifact concentration described above. Many of the artifacts could have been incorporated into agricultural burn piles on the property. Alternatively some of the historic artifacts could be associated with construction or maintenance of the railroad line adjacent to the property.

Three prehistoric artifacts were found while searching for the boundaries of the historic trash concentration described above. The artifacts, which include two cores and a flake tool (Photos 5-7), were found widely dispersed and their original association is unclear (Figure 3). The three prehistoric artifacts are described below.

A core can be described as the discarded portion of lithic (stone) raw material from which flakes have been chipped by prehistoric stone tool makers. Core A is discoid in shape and was made from a high quality white opaque chert (Photo 5). This artifact measures 57mm in length, 63 mm in width, and 25 mm in thickness. The core surface still retains patches of cortex (natural weathered surface of the rock), and there is one large flake removal scar evident on one face, and core preparation flake scars on all surfaces. This core is typical of those found from other Bay Area sites (WSA 2002a, 2002b) and is reflective of a relatively simple flaking method used to produce a single large flake of uniform size that could be retouched (shaped) into a flake tool.

Core B is a single platform core (all flakes were struck from one core edge) made from a metamorphosed sandstone river cobble (Photo 6). This artifact exhibits some battering on one end, and it may have served as a hammerstone (object used to strike flakes from a core) prior to being flaked. There are two large flake scars and at least four smaller scars on the primary flake release surface. Core B measures 79mm in length, 53mm in width, and 42mm in thickness.

Flake tools are flakes, flake fragments, or shatter that have been modified either in preparation for use, or have edge damage incurred during use. The flake tool found on the Cline Property (Photo 7) was made from a large cortical white opaque chert flake blank that was probably struck from a discoid core similar to Core A described above based on the shape and angle of the flake platform (location where the flake was struck). The tool measures 65mm in length, 39mm in width, and 16mm in thickness. One edge is steep and concave in shape and was probably used for scraping hard materials such as bone or wood. The other edge is convex with a more acute angle.

Besides the cores, no other tool production byproducts (waste flakes) were found on the Cline Property. This could suggest that the cores and scraper found here were produced elsewhere and were brought into the site, or that other artifacts, if they exist have been disked under the ground surface. A third possibility is that the three prehistoric artifacts found here were brought to the surface from a buried cultural deposit during deep mechanical soil ripping and conditioning, a practice commonly done in preparation for vineyard planting.

The concentration of historic artifacts and scatter prehistoric artifacts described above will be referred to hereafter as *Cline Property Site 1*. State of California Department of Parks and Recreation (DPR) forms have been prepared for the site (Appendix E).

POTENTIAL IMPACTS OF THE PROPOSED PROJECT

Impact Evaluation Criteria

The California Environmental Quality Act (CEQA) guidelines require that the proposed project take into consideration the potential effect of the undertaking on cultural resources. In order to evaluate the potential effect of the project on architectural and historic resources (over 45 years in age) or prehistoric archaeological resources, a records and literature search was conducted at the NIC to establish the location of previously conducted cultural resource surveys and known resources within a one-quarter-mile radius of all project components. This background record search also provided a basis from which to predict the archaeological potential of the area.

In accordance with CEQA regulations, if the area has not been previously surveyed, or if surveyed and/or documented inadequately, a qualified archaeologist must then conduct a survey of all project components as a means of identifying and assessing the potential impact of the project on known or predicted cultural resources. Site significance criteria are those contained in CEQA Section 15064.5 and 36 CFR 60.4. Literature on the history, prehistory, and ethnography of the area was also consulted as an aid in developing the archaeological potential of the area, and to prepare a setting section for use in evaluating the significance of known or predicted resources.

CEQA contains provisions relative to preservation of historic and prehistoric cultural sites. Section 15126.4 of CEQA directs public agencies to "avoid damaging effects" on an archeological resource whenever feasible. If avoidance is not feasible, the importance of the site shall be evaluated to determine impact and develop mitigation measures.

CEQA Section 15064.5 states: Generally, a resource shall be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing on the California Register of Historical Resources (Pub. Res. Code SS5024.1, Title 14 CCR, Section 4852) including the following:

(A) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
(B) Is associated with the lives of persons important in our past;
(C) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
(D) Has yielded, or may be likely to yield, information important in prehistory or history.

Archaeological site evaluation assesses the potential of each site to meet one or more of the criteria for "importance" based upon visual surface and subsurface evidence (if available) at each site location, information gathered during the literature and record searches, and the researcher's knowledge of and familiarity with the historic or prehistoric context associated with each site.

Site Evaluation - Cline Property Specific Plan Project Resource Site 1

Cline Property Specific Plan Project resource Site #1 (see DRP Form in Appendix E) contains both historic and prehistoric artifacts. Due to historic and recent agricultural soil disturbance the original association or location of the artifacts is unclear. The historic artifacts do not appear to be associated with the location of any historic structure or feature within the project area. Based on a paucity of diagnostic features, the historic artifacts can only be broadly dated from more recent to the early 20th Century in date. Similarly, the prehistoric artifacts are few in number and were found widely dispersed across the ground surface. The prehistoric artifacts are not spatially or temporally diagnostic. Cline Property Site 1 would not appear to be eligible for the California Register of Historical Resources under any of the criteria listed above at this time. However, significant historic and prehistoric artifacts or features associated with the surface finds from Cline Property Specific Plan Project resource Site #1 may still exist below the ground surface in the project area. Destruction of potentially significant cultural resources without mitigation would be a significant impact under CEQA.

Potential Project Impacts

Impacts to cultural resources may result either directly or indirectly during the pre-construction, construction, and operational phases of the project. Direct impacts are those which may result from the immediate disturbance of resources, whether from vegetation removal, vehicle travel over the surface, earth-moving activities, excavation, or alteration of the setting of a resource. Indirect impacts are those which may result from increased erosion due to site clearance and preparation, or from inadvertent damage or outright vandalism to exposed resources due to improved visibility or access.

Exposure of cultural resources during preconstruction site preparation or during construction excavation can also have a beneficial effect by making the data accessible for research. If these resources and their temporal and spatial context receive proper protection and analysis, they can add to the understanding of human adaptation to the environment and subsequent uses of the land and its resources. Analysis of cultural resources also can provide a very important key to changes in population and human movement within and throughout a geographic region.

The potential for the project to impact sensitive cultural resources is directly related to the likelihood that such resources are present and whether they are actually encountered during project development and construction activities. During the current effort to locate and identify historic or prehistoric cultural resources, one documented prehistoric site (CA-CCO-130) was documented within ¼ mile of the Project site (though this resource could have been mapped erroneously). The archaeological survey effort identified a scatter of historic and prehistoric artifacts within the Cline Property Specific Plan Project site.

Recommendations and Mitigation Measures

Since prehistoric cultural resources (as evidenced by site CA-CCO-130) may, as noted above, have been recorded within ¼ mile of the Project site, and historic and prehistoric artifacts were found within the Project site, there is a strong possibility that other artifacts may be encountered during project-related site clearance and excavation. Although the historic refuse scatter identified in the pedestrian survey appears to lack integrity and may not be eligible for listing in the California or National Register of Historic Places, it is nonetheless recommended that mitigation address the possibility of Project ground disturbance activities encountering potentially significant buried historic deposits associated with the surface scatter.

The following two mitigation measures would reduce this potentially significant impact to a less-than-significant level. Recommended mitigation measures include the training of construction personnel, and construction monitoring. No mitigation is required for the operation phase of the proposed project.

Mitigation Measures

1. **Construction Personnel Training.** All construction personnel shall be trained regarding the recognition of possible buried cultural remains, including prehistoric and historic resources during construction, prior to the initiation of construction or ground-disturbing

activities. The project sponsor shall complete training for all construction personnel. Training shall inform all construction personnel of the procedures to be followed upon the discovery of archaeological materials, including Native American burials. The following issues shall be addressed in training or in preparation for construction:

Any excavation contract (or contracts for other activities that may have subsurface soil impacts) shall include clauses that require construction personnel to attend training so they are aware of the potential for inadvertently exposing buried archaeological deposits.

The project sponsor shall provide a background briefing for supervisory construction personnel describing the potential for exposing cultural resources and anticipated procedures to treat unexpected discoveries. Should unanticipated finds be uncovered during construction, work in the immediate vicinity must cease until an archaeologist is informed and an assessment of the historic or prehistoric resources is conducted. In the event that Native American human remains or funerary objects are discovered, the provisions of the California Health and Safety Code should be followed. Section 7050.5(b) of the California Health and Safety Code should be implemented in the event that human remains or possible human remains are located. It states:

In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined, in accordance with Chapter 10 (commencing with Section 27460) of Part 3 of Division 2 of Title 3 of the Government Code, that the remains are not subject to the provisions of Section 27492 of the Government Code or any other related provisions of law concerning investigation of the circumstances, manner and cause of death, and the recommendations concerning treatment and disposition of the human remains have been made to the person responsible for the excavation, or to his or her authorized representative, in the manner provided in Section 5097.98 of the Public Resources Code.

The County Coroner, upon recognizing the remains as being of Native American origin, is responsible to contact the Native American Heritage Commission within twenty-four hours. The Commission has various powers and duties to provide for the ultimate disposition of any Native American remains, as does the assigned Most Likely Descendant. Sections 5097.98 and 5097.99 of the Public Resources Code also call for "protection to Native American human burials and skeletal remains from vandalism and inadvertent destruction." A combination of preconstruction worker training and intermittent construction monitoring by a qualified archaeologist will serve to achieve compliance with this requirement for protection of human remains. Worker training typically instructs workers as to the potential for discovery of cultural or human remains, and both the need for proper and timely reporting of such finds, and the consequences of failure thereof.

Once the find has been identified, the archaeologist will make the necessary plans for treatment of the find(s) and for the evaluation and mitigation of impacts if the finds are found to be significant according to CEQA.

2. **Construction Monitoring**. Archaeological monitoring shall be conducted by a qualified archaeologist familiar with the types of historic and prehistoric resources that could be encountered along the transmission line corridor. Monitoring shall occur during ground disturbing construction within the project area, or at the discretion of the consulting principal archaeologist. The qualifications of the principal archaeologist shall be approved by the City of Oakley.

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APPENDIX A

Figure 1: Project Vicinity Map
Figure 2: Location Map

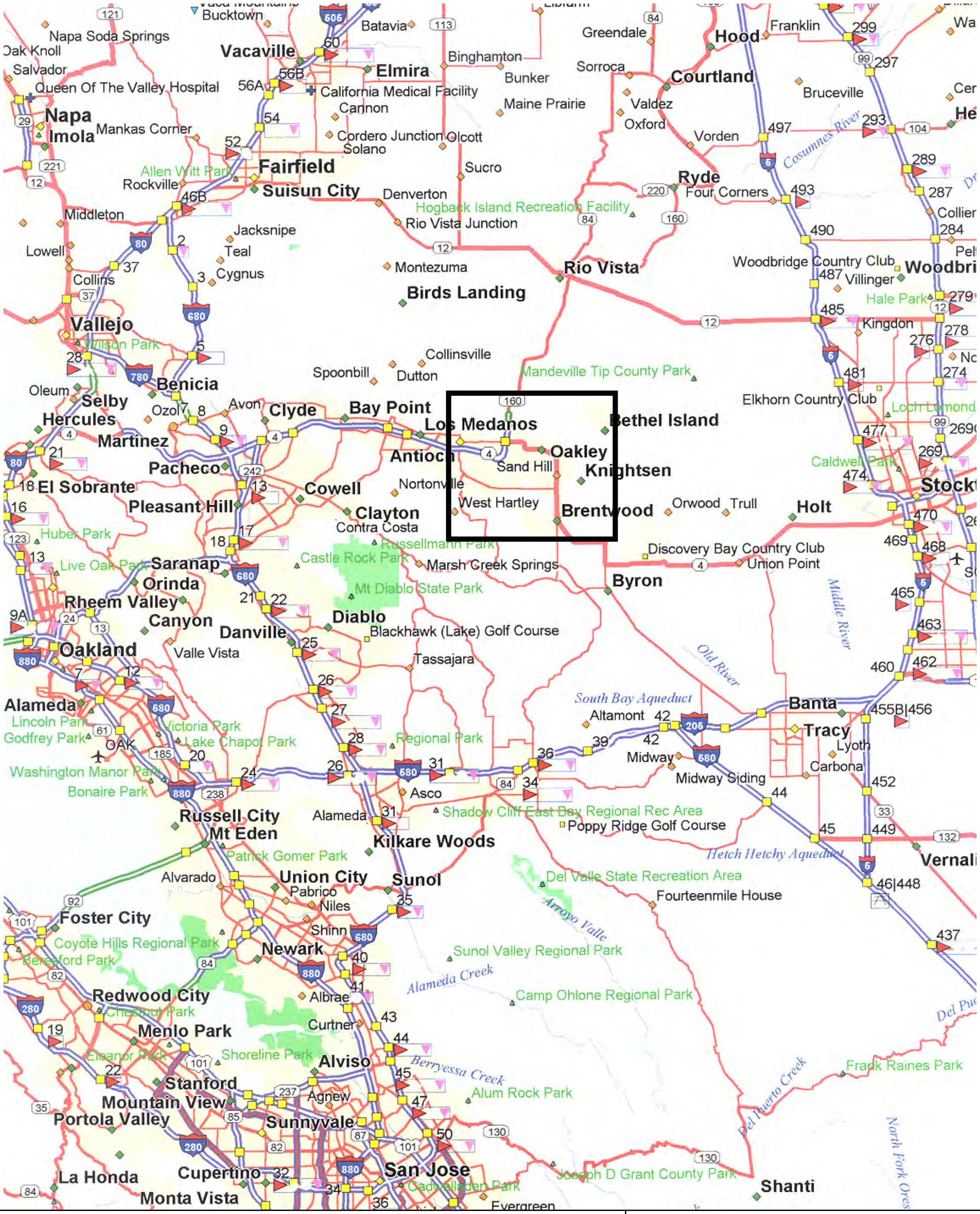

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Figure 1: Project Vicinity Map

Scale: 1:500,000 (1 inch = 7.9 miles)

Cline Property Specific Plan
Oakley, California

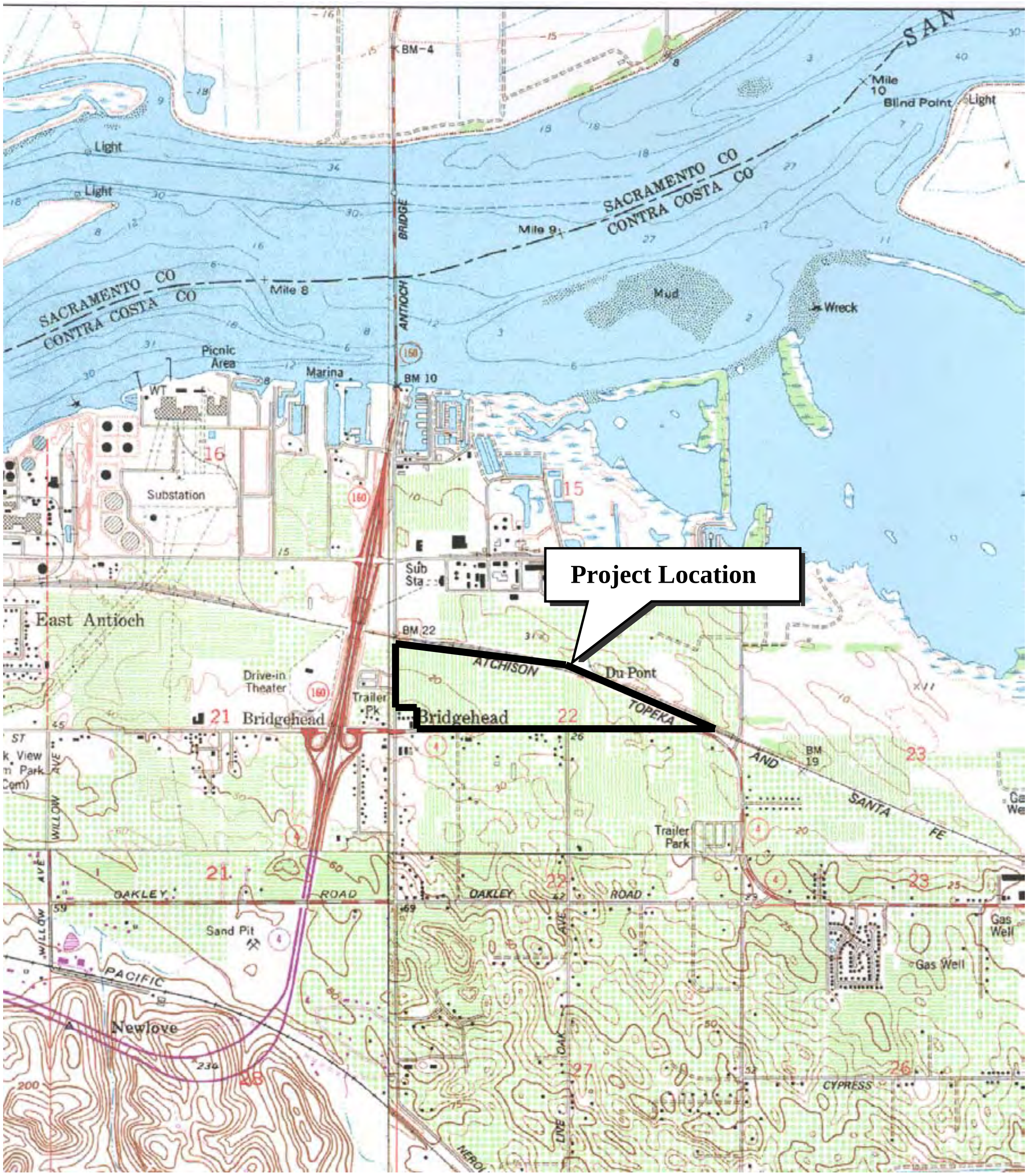

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Figure 2: Project Location Map
1978 Jersey Island USGS Quad Map
Scale: 1:24,000 (1 inch = 2000 feet)

Cline Property Specific Plan
Oakley, California

William Self Associates, Inc.

APPENDIX C

Native American Heritage Commission Letter

WSA

Consultants in Archaeology and Historic Preservation

Native American Heritage Commission
915 Capitol Mall, Room 364
Sacramento, CA 95814

September 29, 2003

RE: CULTURAL RESOURCES INVENTORY OF PROPOSED CLINE PROPERTY SPECIFIC PLAN PROJECT, CONTRA COSTA COUNTY, CALIFORNIA

Dear Native American Heritage Commission:

William Self Associates has recently been contracted to conduct a record search and archaeological survey of the proposed ± 71-acre Cline Property Specific Plan Project (see attached map). The project area is located on the USGS Jersey Island, Calif. topographic quadrangle (1978) in Township 2 North, Range 2 East, Section 22.

We bring this project to the attention of the Native American Heritage Commission with the desire to obtain pertinent information regarding prehistoric, historic and/or ethnographic land use and sites of Native American traditional or cultural value that might be known to exist within the project vicinity, as depicted in the Sacred Lands database or other files under your jurisdiction. We would also appreciate obtaining a list of interested Native American tribal entities or Most Likely Descendents for the project area. We have made contact with the California Historical Resources Information System at Sonoma State University, Rohnert Park, to review their files as part of the background research on the project.

We would appreciate a response, at your earliest convenience, should you have information relative to this request. Should you have any questions, I can be reached at (925) 253-9070.

Thanks again for your assistance.

Sincerely,

WILLIAM SELF ASSOCIATES

Leigh Martin

Leigh Martin
Senior Archaeologist

P.O. Box 2192
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William Self Associates

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STATE OF CALIFORNIA Gray Davis, Governor

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-4082
Fax (916) 657-5390
Web Site www.nahc.ca.gov

October 10 2003

Leigh Martin
WSA

Sent by Fax: 925-254-3553
No of Pages: 2

RE: Proposed Cline Property Specific Plan Project, Contra Costa County.

Dear Ms. Martin:

A record search of the sacred land file has failed to indicate the presence of Native American cultural resources in the immediate project area. The absence of specific site information in the sacred lands file does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Enclosed is a list of Native Americans individuals/organizations who may have knowledge of cultural resources in the project area. The Commission makes no recommendation or preference of a single individual, or group over another. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated, if they cannot supply information, they might recommend other with specific knowledge. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact me at (916) 653-4038.

Sincerely,

Debbie Pilas-Treadway
Environmental Specialist III

NATIVE AMERICAN CONTACTS
Contra Costa County
October 10, 2003

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This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regards to the cutural assessmet for the proposed
Cline Property Specific Plan project, Contra Costa County

Appendix G

Air Quality Impact Analysis

AIR QUALITY IMPACT ANALYSIS FOR THE PROPOSED CLINE PROPERTY SPECIFIC PLAN, CITY OF OAKLEY

Prepared for:

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November 2006

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INTRODUCTION

This report describes the effects of the Cline Property Specific Plan on local and regional air quality. This report is intended to meet the requirements of the Bay Area Air Quality Management District's (BAAQMD) guidance for environmental documents.[1] It addresses existing air quality conditions, the impacts of the project during construction, and permanent local and regional air quality impacts. Where significant air quality impacts are identified, mitigation measures are described that would reduce or eliminate the impact.

EXISTING CONDITIONS

Air Pollution Climatology

Oakley is located on the south side of the San Joaquin River delta, east of the Carquinez Straits. Its location between the greater Bay Area and the Central Valley has great influence on the climate and air quality of the area. It is located at the eastern boundary of the 9-county San Francisco Bay Area Air Basin. Oakley is a few miles west of San Joaquin County, which is part of the neighboring 8-county San Joaquin Valley Air Basin.

Oakley has a relatively low potential for air pollution given the persistent and strong winds typical of the area. Wind records from the closest wind-measuring sites show a strong predominance of westerly winds. Average wind speed is relatively high and the frequency of calm winds is quite low.[2] These winds dilute pollutants and transport them away from the area, so that emissions released in the project area have more influence on air quality in the Sacramento and San Joaquin valleys than they do locally. There are, however, several major stationary sources in upwind cities that can influence local air quality, and the project's location downwind of the greater Bay Area also means that pollutants from other areas are transported to the area.

Ambient Air Quality Standards

Criteria Pollutants

Both the U. S. Environmental Protection Agency and the California Air Resources Board (CARB) have established ambient air quality standards for common pollutants. These ambient air quality standards are levels of contaminants which represent safe levels that avoid specific adverse health effects associated with each pollutant. The ambient air quality standards cover what are called "criteria" pollutants because the health and other effects of each pollutant are described in criteria documents. Table 1 identifies the major

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[1] Bay Area Air Quality Management District, BAAQMD CEQA Guidelines, 1996 (Revised 1999).

[2] California Department of Water Resources, Wind in California, Bulletin No. 185, January 1978.

criteria pollutants, characteristics, health effects and typical sources. The federal and California state ambient air quality standards are summarized in Table 2.

The federal and state ambient standards were developed independently with differing purposes and methods, although both processes attempted to avoid health-related effects. As a result, the federal and state standards differ in some cases. In general, the California state standards are more stringent. This is particularly true for ozone and particulate matter (PM_{10} and $PM_{2.5}$)

Toxic Air Contaminants

In addition to the criteria pollutants discussed above, Toxic Air Contaminants (TACs) are another group of pollutants of concern. There are many different types of TACs, with varying degrees of toxicity. Sources of TACs include industrial processes such as petroleum refining and chrome plating operations, commercial operations such as gasoline stations and dry cleaners, and motor vehicle exhaust. Cars and trucks release at least forty different toxic air contaminants. The most important, in terms of health risk, are diesel particulate, benzene, formaldehyde, 1,3-butadiene and acetaldehyde.

Public exposure to TACs can result from emissions from normal operations, as well as accidental releases. Health effects of TACs include cancer, birth defects, neurological damage and death.

Ambient Air Quality

The Bay Area Air Quality Management District has for many years operated a multi-pollutant monitoring site in nearby Bethel Island. Table 3 shows historical occurrences of pollutant levels exceeding the state/federal ambient air quality standards for the three-year period 2003-2005. The number of days that each standard was exceeded is shown.

Table 3 shows that all federal ambient air quality standards are met in the Oakley area with the exception of ozone. Additionally, the state ambient standards of ozone and PM_{10} are regularly exceeded.

Attainment Status and Regional Air Quality Plans

The federal Clean Air Act and the California Clean Air Act of 1988 require that the State Air Resources Board, based on air quality monitoring data, designate portions of the state where the federal or state ambient air quality standards are not met as "nonattainment areas". Because of the differences between the national and state standards, the designation of nonattainment areas is different under the federal and state legislation.

Table 1: Major Criteria Pollutants

Pollutant	**Characteristics**	**Health Effects**	**Major Sources**
Ozone	A highly reactive photochemical pollutant created by the action of sunshine on ozone precursors (primarily reactive hydrocarbons and oxides of nitrogen. Often called photochemical smog.	Eye Irritation Respiratory function impairment.	The major sources ozone precursors are combustion sources such as factories and automobiles, and evaporation of solvents and fuels.
Carbon Monoxide	Carbon monoxide is an odorless, colorless gas that is highly toxic. It is formed by the incomplete combustion of fuels.	Impairment of oxygen transport in the bloodstream. Aggravation of cardiovascular disease. Fatigue, headache, confusion, dizziness. Can be fatal in the case of very high concentrations.	Automobile exhaust, combustion of fuels, combustion of wood in woodstoves and fireplaces.
Nitrogen Dioxide	Reddish-brown gas that discolors the air, formed during combustion.	Increased risk of acute and chronic respiratory disease.	Automobile and diesel truck exhaust, industrial processes, fossil-fueled power plants.
Sulfur Dioxide	Sulfur dioxide is a colorless gas with a pungent, irritating odor.	Aggravation of chronic obstruction lung disease. Increased risk of acute and chronic respiratory disease.	Diesel vehicle exhaust, oil-powered power plants, industrial processes.
Particulate Matter (PM_{10} and $PM_{2.5}$)	Solid and liquid particles of dust, soot, aerosols and other matter which are small enough to remain suspended in the air for a long period of time.	Aggravation of chronic disease and heart/lung disease symptoms.	Combustion, automobiles, field burning, factories and unpaved roads. Also a result of photochemical processes.

Table 2: Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Primary Standard	State Standard
Ozone	1-Hour 8-Hour	-- 0.08 PPM	0.09 PPM 0.07 PPM
Carbon Monoxide	8-Hour 1-Hour	9.0 PPM 35.0 PPM	9.0 PPM 20.0 PPM
Nitrogen Dioxide	Annual Average 1-Hour	0.05 PPM --	-- 0.25 PPM
Sulfur Dioxide	Annual Average 24-Hour 1-Hour	0.03 PPM 0.14 PPM --	-- 0.04 PPM 0.25 PPM
PM_{10}	Annual Average 24-Hour	50 µg/m^3 150 µg/m^3	20 µg/m^3 50 µg/m^3
$PM_{2.5}$	Annual 24-Hour	15 µg/m^3 65 µg/m^3	12 µg/m^3 --
Lead	Calendar Quarter 30 Day Average	1.5 µg/m^3 --	-- 1.5 µg/m^3
Sulfates	24 Hour	25 µg/m^3	--
Hydrogen Sulfide	1-Hour	0.03 PPM	--
Vinyl Chloride	24-Hour	0.01 PPM	--

PPM = Parts per Million
µg/m^3 = Micrograms per Cubic Meter

Source: California Air Resources Board, Ambient Air Quality Standards (5/17/06) http://www.arb.ca.gov.aqs/aaqs2.pdf

Table 3: Air Quality Data Summary for Bethel Island, 2003-2005

Pollutant	**Standard**	**Days Standard Exceeded During:**		
		2003	**2004**	**2005**
Ozone	1-Hour State 1-Hour Federal 8-Hour Federal	0 0 0	1 0 0	0 0 0
Carbon Monoxide	8-Hour St. Fed. 1-Hour State	0 0	0 0	0 0
Nitrogen Dioxide	1-Hour State	0	0	0
Sulfur Dioxide	1-Hour State 24-Hour State	0 0	0 0	0 0
PM_{10}	24-Hour State 24-Hour Federal	1 0	0 0	1 0

Source: Air Resources Board, Aerometric Data Analysis and Management (ADAM), 2006. (http: //www.arb.ca.gov./adam/cgi-bin/adamtop/d2wstart)

The U. S. Environmental Protection Agency has classified the San Francisco Bay Area as a non-attainment area for the federal 8-hour ozone standard. The Bay Area was designated as unclassifiable/attainment for the federal $PM_{2.5}$ standards.

Under the California Clean Air Act Contra Costa County is a non-attainment area for ozone and particulate matter (PM_{10} and $PM_{2.5}$). The county is either attainment or unclassified for other pollutants.

Air districts periodically prepare and update plans to achieve the goal of healthy air. Bay Area plans are prepared with the cooperation of the Metropolitan Transportation Commission, and the Association of Bay Area Governments (ABAG). Ozone Attainment Demonstrations are prepared for the national ozone standard and Clean Air Plans are prepared for the California ozone standard.

The *Bay Area 2001 Ozone Attainment Plan* is the current federal air quality plan. This plan was a revision to the Bay Area part of California's plan (State Implementation Plan, or SIP) to achieve the national ozone standard. The plan was approved by the California Air Resources Board (CARB) and on November 30, 2001, CARB submitted the 2001 Plan to the U.S. Environmental Protection Agency. The U.S. Environmental Protection Agency is currently reviewing the plan.

The Bay Area Air Quality Management District, in cooperation with the Metropolitan Transportation Commission (MTC) and ABAG, has recently prepared the *Bay Area 2005 Ozone Strategy*. The Ozone Strategy is a roadmap showing how the San Francisco Bay Area will achieve compliance with the State one-hour air quality standard for ozone as expeditiously as practicable and how the region will reduce transport of ozone and ozone precursors to neighboring air basins.

Sensitive Receptors

The Bay Area Air Quality Management District defines sensitive receptors as facilities where sensitive receptor population groups (children, the elderly, the acutely ill and the chronically ill) are likely to be located. These land uses include residences, schools, playgrounds, childcare centers, retirement homes, convalescent homes, hospitals and medical clinics. Sensitive land uses near the project site include residences adjacent to the northwest corner of the site.

IMPACTS AND MITIGATION MEASURES

Significance Criteria

BAAQMD CEQA Guidelines[3] provide the following definitions of a significant air quality impact:

- A project contributing to carbon monoxide (CO) concentrations exceeding the State Ambient Air Quality Standard of 9 parts per million (ppm) averaged over 8 hours or 20 ppm for 1 hour would be considered to have a significant impact.

- A project that generates criteria air pollutant emissions in excess of the BAAQMD annual or daily thresholds would be considered to have a significant air quality impact. The current thresholds are 15 tons/year or 80 pounds/day for Reactive Organic Gases (ROG), Nitrogen Oxides (NO_x) or PM_{10}. Any proposed project that would individually have a significant air quality impact would also be considered to have a significant cumulative air quality impact.

- Any project with the potential to frequently expose members of the public to objectionable odors would be deemed to have a significant impact.

- Any project with the potential to expose sensitive receptors or the general public to substantial levels of toxic air contaminants would be deemed to have a significant impact.

Despite the establishment of both federal and state standards for $PM_{2.5}$ (particulate matter, 2.5 microns), the BAAQMD has not developed a threshold of significance for this pollutant. For this analysis, $PM_{2.5}$ impacts would be considered significant if project emissions of PM_{10} exceed 80 pounds per day.

The BAAQMD significance threshold for construction dust impacts is based on the appropriateness of construction dust controls. The BAAQMD guidelines provide feasible control measures for construction emission of PM_{10}. If the appropriate construction controls are to be implemented, then air pollutant emissions for construction activities would be considered less-than-significant.

Impact 1: Construction Dust Emissions. Construction activities such as clearing, excavation and grading operations, construction vehicle traffic and wind blowing over exposed earth would generate fugitive particulate matter emissions that may temporarily affect local air quality. This impact is potentially significant, but mitigable to a less-than-significant level.

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[3] Bay Area Air Quality Management District, BAAQMD CEQA Guidelines, 1996 (Revised December 1999).

Construction dust would affect local air quality during implementation of the project. The dry, windy climate of the area during the summer months creates a high potential for dust generation if underlying soils are exposed to the atmosphere. The movement of earth on the site is a construction activity with a high potential for creating air pollutants. After grading of the site, dust may continue to affect local air quality during construction of the project.

According to the *BAAQMD CEQA Guidelines*, emissions of ozone precursors (ROG and NOx) and carbon monoxide related to construction equipment are already included in the emission inventory that is the basis for regional air quality plans, and thus are not expected to impede attainment or maintenance of ozone and carbon monoxide standards in the Bay Area. Thus, the effects of construction activities would be increased dustfall and locally elevated levels of PM_{10} downwind of construction activity. Construction dust has the potential for creating a nuisance at nearby properties. This is considered a potentially significant impact, but may be reduced to a less-than-significant level through implementation of the following measure.

Mitigation Measure 1: Consistent with guidance from the BAAQMD, the following measures shall be required of the project and included in all construction contracts:

- Water all active construction areas at least twice daily and more often during windy periods; active areas adjacent to existing land uses shall be kept damp at all times, or shall be treated with non-toxic stabilizers or dust palliatives;
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least 2 feet of freeboard;
- Pave, apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites;
- Sweep daily (preferably with water sweepers) all paved access roads, parking areas, and staging areas at construction sites; water sweepers shall vacuum up excess water to avoid runoff-related impacts to water quality;
- Sweep streets daily (preferably with water sweepers) if visible soil material is carried onto adjacent public streets;
- Apply non-toxic soil stabilizers to inactive construction areas;
- Enclose, cover, water twice daily, or apply non-toxic soil binders to exposed stockpiles (dirt, sand, etc.);
- Limit traffic speeds on unpaved roads to 15 mph;
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways;
- Replant vegetation in disturbed areas as quickly as possible.

The following are additional mitigation measures are recommended by the BAAQMD to reduce engine exhaust emissions, and shall be required as part of the Project:

- Use alternative fueled construction equipment (where available)
- Minimize idling time (5 minutes maximum);
- Use post-combustion controls to treat exhaust;
- Maintain properly tuned equipment;
- Use CARB-certified engines (i.e. three years old or less, and comply with CARB emission standards)
- Limit the hours of operation of heavy equipment and/or the amount of equipment in use, such that heavy equipment is only operating between the hours of 7 AM and 6 PM. Monday through Friday, and 8 AM to 5 PM on Saturday (no use of heavy equipment on Sunday).

The above measures include all feasible measures for construction emissions identified by the Bay Area Air Quality Management District for large sites. According to the District threshold of significance for construction impacts, implementation of the measures would reduce construction impacts of the project to a ***less-than-significant*** level.

Impact 2: Construction TAC Emissions. During construction various diesel-powered vehicles and equipment would be in use on the site. Exposure of sensitive receptors to diesel particulate would represent a ***less-than-significant*** impact.

In 1998 the California Air Resources Board identified particulate matter from diesel-fueled engines as a toxic air contaminant (TAC). CARB has completed a risk management process that identified potential cancer risks for a range of activities using diesel-fueled engines.[4] High volume freeways, stationary diesel engines and facilities attracting heavy and constant diesel vehicle traffic (distribution centers, truckstop) were identified as having the highest associated risk.

Health risks from Toxic Air Contaminants are function of both concentration and duration of exposure. Unlike the above types of sources, construction diesel emissions are temporary, affecting an area for a period of days or perhaps weeks. Additionally, construction related sources are mobile and transient in nature, and the bulk of the emission occurs within the project site at a substantial distance from nearby receptors. Because of its short duration and the fact that nearby sensitive receptors would not be down-wind of construction activity when the wind is from the prevailing west direction, health risks from construction emissions of diesel particulate would be a less-than-significant impact.

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[4] California Air Resources Board, Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles, October 2000.

Mitigation Measure 2: None required.

Impact 3: Permanent Local Impacts. Project traffic would add to carbon monoxide concentrations near streets and intersections providing access to the site. This impact would be ***less-than-significant***.

On the local scale, the project would change traffic on the local street network, changing carbon monoxide levels along roadways used by project traffic. Carbon monoxide is an odorless, colorless poisonous gas whose primary source in the Bay Area is automobiles. Concentrations of this gas are highest near intersections of major roads.

Carbon monoxide concentrations under worst-case meteorological conditions have been predicted for the most heavily traveled nearby intersections. PM peak traffic volumes were applied to the screening form of the CALINE-4 dispersion model to predict maximum 1-and 8-hour concentrations near these intersections under the worst-case assumption that project traffic changes would occur in 2006. Attachment 1 provides a description of the model and a discussion of the methodology and assumptions used in the analysis. The model results were used to predict the maximum 1- and 8-hour concentrations, corresponding to the 1- and 8-hour averaging times specified in the state and federal ambient air quality standards for carbon monoxide.

Table 4 shows the results of the CALINE-4 analysis for the peak 1-hour and 8-hour traffic periods in parts per million (PPM). The 1-hour values are to be compared to the federal 1-hour standard of 35 PPM and the state standard of 20 PPM. The 8-hour values in Table 4 are to be compared to the state and federal standard of 9 PPM.

Table 4 shows that project traffic changes would increase concentrations by up to 1.3 PPM, but concentrations would remain below the most stringent state and federal standards. Concentrations in 2030 with cumulative traffic increases would be below current levels, despite increased traffic, due to the effect of declining emission rates for vehicles. Since project traffic would not cause any new violations of the 8-hour standards for carbon monoxide, nor contribute substantially to an existing or projected violation, project impacts on local carbon monoxide concentrations are considered to be less-than-significant.

Mitigation Measure 3: None required.

Impact 4: Permanent Regional Impacts. Additional trips to and from the project would result in new air pollutant emissions within the air basin. The emissions from these new trips would exceed the BAAQMD thresholds of significance, but these emissions were analyzed in the Oakley 2020 General Plan EIR and do not represent a new significant impact. Implementation of the foregoing measures would serve to minimize all cumulative operational (traffic based) impacts. The analysis shows no potentially significant increases in individual or cumulative effects on the air basin in relation to the programmatic analysis prepared for the Oakley 2020 General Plan; consequently no additional mitigation is required.

Table 4: Worst Case Carbon Monoxide Concentrations Near Selected Intersections, in Parts Per Million

Intersection	Existing (2006)		Existing + Project (2006)		Existing+Project+ Cumulative (2030)	
	1-Hour	8-Hour	1-Hour	8-Hour	1-Hour	8-Hour
Main/ Empire	6.8	4.9	7.2	5.2	3.3	2.4
Main/ Live Oak	6.7	4.8	8.2	5.9	3.4	2.4
Main/ Bridgehead	7.6	5.5	8.2	5.9	3.1	2.3
Main/ SR 160 SB Off	5.4	3.9	6.7	4.8	3.1	2.3
Main/ SR 160 NB On	7.9	5.6	8.4	6.1	3.5	2.5
Main/ Sandy	6.7	4.8	7.4	5.3	3.3	2.4
Most Stringent Standard	20.0	9.0	20.0	9.0	20.0	9.0

Table 5: Project Regional Emissions in Pounds Per Day

	Reactive Organic Gases	**Nitrogen Oxides**	**PM_{10}**
Area Sources	12.1	8.1	0.1
Vehicular Sources	244.4	235.8	186.4
Total	256.5	243.9	186.5
BAAQMD Significance Threshold	80.0	80.0	80.0

Vehicle trips generated by the project would result in air pollutant emissions affecting the entire San Francisco Bay Air Basin. Regional emissions associated with project vehicle use have been calculated using the URBEMIS2002 emission model, as recommended by the BAAQMD. The methodology used in estimating vehicular emissions is described in Attachment 2.

The incremental daily emission increase associated with project land uses is identified in Table 5 for reactive organic gases and oxides of nitrogen (two precursors of ozone) and PM_{10}. The BAAQMD has established threshold of significance for ozone precursors and PM_{10} of 80 pounds per day.

These emissions would contribute to the significant cumulative impacts on regional air quality documented in the Oakley 2020 General Plan EIR, for which a Statement of Overriding Consideration was adopted (see DEIR Appendix I). Because of the consistency of the proposed Specific Plan Project with the General Plan, the emissions associated with the project do not represent a new significant impact.

Mitigation Measure 4: The Oakley General Plan identified numerous policies and programs in the Land Use Element, Circulation Element, Open Space and Conservation Element and Housing Element as providing general mitigation for air quality impacts. The BAAQMD has identified project-level mitigation measures for reducing vehicle emissions from projects. The following measures are intended to reduce vehicle emissions, and shall be required as part of the Project:

- Provide physical improvements, such as sidewalk improvements, landscaping and bicycle parking that would act as incentives for pedestrian and bicycle modes of travel.
- Connect site with regional bikeway/pedestrian trail system.
- Provide transit information kiosks.
- Implement feasible travel demand management (TDM) measures for a project of this type. This would include a ride-matching program, guaranteed ride home programs, coordination with regional ridesharing organizations and transit incentives program.
- Provide showers and lockers for employees bicycling or walking to work.
- Provide secure and conveniently located bicycle parking and storage for workers and patrons.
- Provide electric vehicle charging facilities.
- Provide preferential parking for Low Emission Vehicles (LEVs).

- Utilize reflective (or high albedo) and emissive roofs and light colored construction materials to increase the reflectivity of roads, driveways, and other paved surfaces, and include shade trees near buildings to directly shield them from the sun's rays and reduce local air temperature and cooling energy demand.

Impact 5: Cumulative Impacts. The project is consistent with the Oakley 2020 General Plan and would not have significant cumulative impacts.

According to BAAQMD significance criteria, any proposed project that would individually have a significant air quality impact would also be considered to have a significant cumulative air quality impact. The proposed project would not individually have a significant impact. Implementation of the foregoing measures would serve to minimize all cumulative operational (traffic based) impacts. The analysis shows no potentially significant increases in individual or cumulative effects on the air basin in relation to the programmatic analysis prepared for the Oakley 2020 General Plan; consequently no additional mitigation is required.

Mitigation Measure 5: None required.

ATTACHMENT 1

CALINE-4 MODELING

The CALINE-4 model is a fourth-generation line source air quality model that is based on the Gaussian diffusion equation and employs a mixing zone concept to characterize pollutant dispersion over the roadway. Given source strength, meteorology, site geometry and site characteristics, the model predicts pollutant concentrations for receptors located within 150 meters of the roadway. The CALINE-4 model allows roadways to be broken into multiple links that can vary in traffic volume, emission rates, height, width, etc.

A screening-level form of the CALINE-4 program was used to predict concentrations.[5] Normalized concentrations for each roadway size (2 lanes, 4 lanes, etc.) are adjusted for the two-way traffic volume and emission factor. Calculations were made for a receptor at a corner of the intersection, located at the curb. Emission factors were derived from the California Air Resources Board EMFAC7-2002 computer program based on a 2006 Bay Area vehicle mix.

The screening form of the CALINE-4 model calculates the local contribution of nearby roads to the total concentration. The other contribution is the background level attributed to more distant traffic. The 1-hour background level in 2006 was taken as 2.5 PPM and the 8-hour background concentration was taken as 1.9 PPM. The 1-hour background level in 2030 was taken as 2.3 PPM and the 8-hour background concentration was taken as 1.7 PPM. These backgrounds were estimated using isopleth maps and correction factors developed by the Bay Area Air Quality Management District.

Eight-hour concentrations were obtained from the 1-hour output of the CALINE-4 model using a persistence factor of 0.7.

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[5] Bay Area Air Quality Management District, BAAQMD CEQA Guidelines, 1996.

ATTACHMENT 2

URBEMIS-2002

Estimates of regional emissions generated by project traffic were made using a program called URBEMIS-2002.[6] URBEMIS-2002 is a program that estimates the emissions that result from various land use development projects. Land use project can include residential uses such as single-family dwelling units, apartments and condominiums, and nonresidential uses such as shopping centers, office buildings, and industrial parks. URBEMIS-2002 contains default values for much of the information needed to calculate emissions. However, project-specific, user-supplied information can also be used when it is available.

Inputs to the URBEMIS-2002 program include trip generation rates, vehicle mix, average trip length by trip type and average speed. Trip generation rates for project land uses were provided by the project transportation consultant. Average trip lengths and vehicle mixes for the Bay Area were used. Average speed for all types of trips was assumed to be 30 MPH.

The URBEMIS-2002 run assumed summertime conditions with an ambient temperature of 85 degrees F.

The analysis was carried out assuming project build-out would occur by the year 2006. The URBEMIS-2002 output is attached.

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[6] Jones and Stokes Associates, Software User=s Guide: URBEMIS2002 for Windows with Enhanced Construction Module, Version 8.7, April 2005.

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               URBEMIS 2002 For Windows   8.7.0

File Name:                      C:\Program Files\URBEMIS 2002 Version 8.7\Projects2k2\cline.urb
Project Name:                   Cline Project
Project Location:               San Francisco Bay Area
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                       SUMMARY REPORT
                    (Pounds/Day - Summer)

AREA SOURCE EMISSION ESTIMATES
                                    ROG       NOx        CO       SO2      PM10
 TOTALS (lbs/day,unmitigated)     12.11      8.14     10.72      0.00      0.03


OPERATIONAL (VEHICLE) EMISSION ESTIMATES
                                    ROG       NOx        CO       SO2      PM10

 TOTALS (lbs/day,unmitigated)    244.37    235.77  2,405.62      2.06    186.42

SUM OF AREA AND OPERATIONAL EMISSION ESTIMATES
                                    ROG       NOx        CO       SO2      PM10
 TOTALS (lbs/day,unmitigated)    256.47    243.90  2,416.34      2.06    186.45
```

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               URBEMIS 2002 For Windows   8.7.0

File Name:                      C:\Program Files\URBEMIS 2002 Version 8.7\Projects2k2\cline.urb
Project Name:                   Cline Project
Project Location:               San Francisco Bay Area
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

                        DETAIL REPORT
                    (Pounds/Day - Summer)

AREA SOURCE EMISSION ESTIMATES (Summer Pounds per Day, Unmitigated)
    Source                         ROG       NOx        CO       SO2      PM10
 Natural Gas                      0.59      8.12      6.82         0      0.01
 Hearth - No summer emissions
 Landscaping                      0.62      0.02      3.90      0.00      0.01
 Consumer Prdcts                  0.00         -         -         -         -
 Architectural Coatings          10.90         -         -         -         -
 TOTALS(lbs/day,unmitigated)     12.11      8.14     10.72      0.00      0.03
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                 UNMITIGATED OPERATIONAL EMISSIONS

                                ROG       NOx        CO       SO2      PM10
Hotel                          2.92      2.04     20.89      0.02      1.68
Discount store                33.19     30.99    316.64      0.27     24.00
Discount Superstore          103.94    103.85  1,058.85      0.91     82.95
Retail                        73.12     69.82    712.70      0.61     54.89
Home improvement supersto     31.19     29.06    296.53      0.25     22.90

TOTAL EMISSIONS (lbs/day)    244.37    235.77  2,405.62      2.06    186.42

Includes correction for passby trips.
Does not include double counting adjustment for internal trips.

OPERATIONAL (Vehicle) EMISSION ESTIMATES

Analysis Year: 2006  Temperature (F): 85   Season: Summer

EMFAC Version: EMFAC2002 (9/2002)

Summary of Land Uses:

                                                                  No.      Total
Unit Type                 Acreage    Trip Rate                    Units    Trips

Hotel                                 4.00 trips/rooms            75.00   300.00
Discount store                       56.02 trips/1000 sq. ft.    100.00 5,602.00
Discount Superstore                  73.75 trips/1000 sq. ft.    231.0017,036.25
Retail                               49.84 trips/1000 sq. ft.    242.0012,061.28
Home improvement supersto            29.80 trips/1000 sq. ft.    167.00 4,976.60

                                                Sum of Total Trips    39,976.13
                                       Total Vehicle Miles Traveled   122,230.63

Vehicle Assumptions:

Fleet Mix:

Vehicle Type             Percent Type    Non-Catalyst     Catalyst         Diesel
Light Auto                  55.60            2.20           97.30            0.50
Light Truck < 3,750   lbs   15.10            4.00           93.40            2.60
Light Truck  3,751- 5,750   15.90            1.90           96.90            1.20
Med Truck    5,751- 8,500    7.00            1.40           95.70            2.90
Lite-Heavy   8,501-10,000    1.10            0.00           81.80           18.20

Lite-Heavy  10,001-14,000    0.30            0.00           66.70           33.30
Med-Heavy   14,001-33,000    1.00           10.00           20.00           70.00
Heavy-Heavy 33,001-60,000    0.90            0.00           11.10           88.90
Line Haul > 60,000    lbs    0.00            0.00            0.00          100.00
Urban Bus                    0.10            0.00            0.00          100.00
Motorcycle                   1.70           82.40           17.60            0.00
School Bus                   0.10            0.00            0.00          100.00
Motor Home                   1.20            0.00           91.70            8.30

Travel Conditions
                                Residential                 Commercial
                          Home-     Home-     Home-
                          Work      Shop      Other    Commute  Non-Work Customer
Urban Trip Length (miles) 11.8       4.6       6.1       11.8       5.0       5.0
Rural Trip Length (miles) 15.0      10.0      10.0       15.0      10.0      10.0
Trip Speeds (mph)         30.0      30.0      30.0       30.0      30.0      30.0
% of Trips - Residential  27.3      21.2      51.5

% of Trips - Commercial (by land use)
Hotel                                                     5.0       2.5      92.5
Discount store                                            2.0       1.0      97.0
Discount Superstore                                       2.0       1.0      97.0
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Retail                                                   2.0       1.0      97.0
Home improvement superstore                              2.0       1.0      97.0


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Changes made to the default values for Land Use Trip Percentages

The Diverted Trip % for Discount store changed from 45 to 38
The Pass-By Trip % for Discount store changed from 10 to 17
The Diverted Trip % for Discount superstore changed from 40 to 28
The Pass-By Trip % for Discount superstore changed from 5 to 17
The Diverted Trip % for Regnl shopping cntr changed from 35 to 11
The Pass-By Trip % for Regnl shopping cntr changed from 10 to 34
The Diverted Trip % for Home improvement superstore changed from 40 to 55
The Pass-By Trip % for Home improvement superstore changed from 15 to 0

Changes made to the default values for Area


Changes made to the default values for Operations

The operational emission year changed from 2005 to 2006.
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Appendix H

Retail Market Impact Analysis

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REVISED ADMINISTRATIVE REVIEW DRAFT
RETAIL MARKET IMPACT ANALYSIS
FOR
PROPOSED RETAIL
CLINE PROPERTY SPECIFIC PLAN
IN OAKLEY, CALIFORNIA

Prepared for:
City of Oakley

Prepared by:
Bay Area Economics

May 29, 2007

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Table of Contents

Executive Summary

Background and Study Purpose

The Cline Property owners are working with the City of Oakley to prepare a specific plan for development of the Cline Property. As part of its evaluation of the proposed specific plan, the City of Oakley has retained Richard T. Loewke, AICP to complete an Environmental Impact Report (EIR). Recent California court decisions (*Bakersfield Citizens for Local Control v. City of Bakersfield, Panama 99 Properties LLC, and Castle & Cooke Commercial-CA, Inc.*, as well as *Dolan Ingram, et al. v. City of Redding and Wal-Mart, Inc, et al.*) have made clear that for large retail developments, an economic impact analysis should be undertaken to assess the possibility of “urban decay” and deterioration as an indirect physical impact of the Specific Plan on the environment. In the Bakersfield decision, the Appellate Court made clear that such an impact needed to be given “meaningful consideration.” Both cases indicate that to fully satisfy the requirements of CEQA, the analysis must look at economic impacts and then follow the causal chain to determine the likelihood that new retail space will cause existing space to become vacant, and, if such vacancies are determined likely, to then determine the potential for urban decay and physical deterioration of those existing retail centers and nodes. The City of Oakley has retained Bay Area Economics (BAE) to undertake an economic impact analysis as part of the EIR process for this project. BAE aims to use the best available information to assess the economic impacts and then establish whether these economic impacts might result in a negative effect on the physical environment of Oakley and the surrounding communities as manifested by urban decay and physical deterioration of existing retail centers.

Project Description

The City of Oakley and its Redevelopment Agency sponsored the preparation of the Cline Property Specific Plan (referred to in this report as the “Specific Plan”) guiding future development on the Cline property (the “Proposed Project”) located along the north side of Main Street, east of Bridgehead Road at Oakley’s westerly entrance from Highway 160. The Draft Specific Plan incorporates a Development Plan accommodating three to four principal building sites for major retail uses ranging from approximately 120,000 to 230,000 square feet of gross floor area (GFA). The Specific Plan authorizes a development range of from approximately 630,000 square feet (Lower Intensity Alternative 2) to approximately 770,000 square feet (Higher Intensity Alternative 1). The Proposed Project is modeled after Alternative 1 (Higher Intensity) and consists of a mix of retail space configurations in several large buildings and free-standing pads, including three anchor spaces of more than 100,000 square feet, additional store spaces ranging from 4,000 to 30,000 square feet, and several pad spaces suitable primarily for restaurants. This Higher Intensity alternative has been used for analysis of Project impacts in the DEIR because it represents the maximum potential aggregate development, including the maximum anchor (Major Retailers) and maximum additional store (Secondary Retailers) spaces. At this time, there are no committed tenants but the assumed anchor tenants are a large-format 230,000 square foot general merchandise discount supercenter with approximately 65,000 square feet of supermarket-equivalent use and also providing sales of garden, and other goods and services typically found in a large store of this type; a 170,000 square foot home improvement center; a third approximately 120,000 square foot big box retailer such as a large apparel or durable goods store; up to an additional 220,000 square feet of general retail use including restaurants; and one hotel providing up to 100 rooms (maximum of between 30,000 and 40,000 square feet). The Specific Plan provides an option for replacement of the hotel with up to a similar quantity of retail space. This report does not address the hotel use but instead focuses on the proposed project's retail sales potential in the current and future market and any potential urban decay impacts associated with the retail development. The use of the Higher Intensity alternative with a discount general merchandise supercenter allows for an analysis of a "worst case" scenario with respect to urban decay.

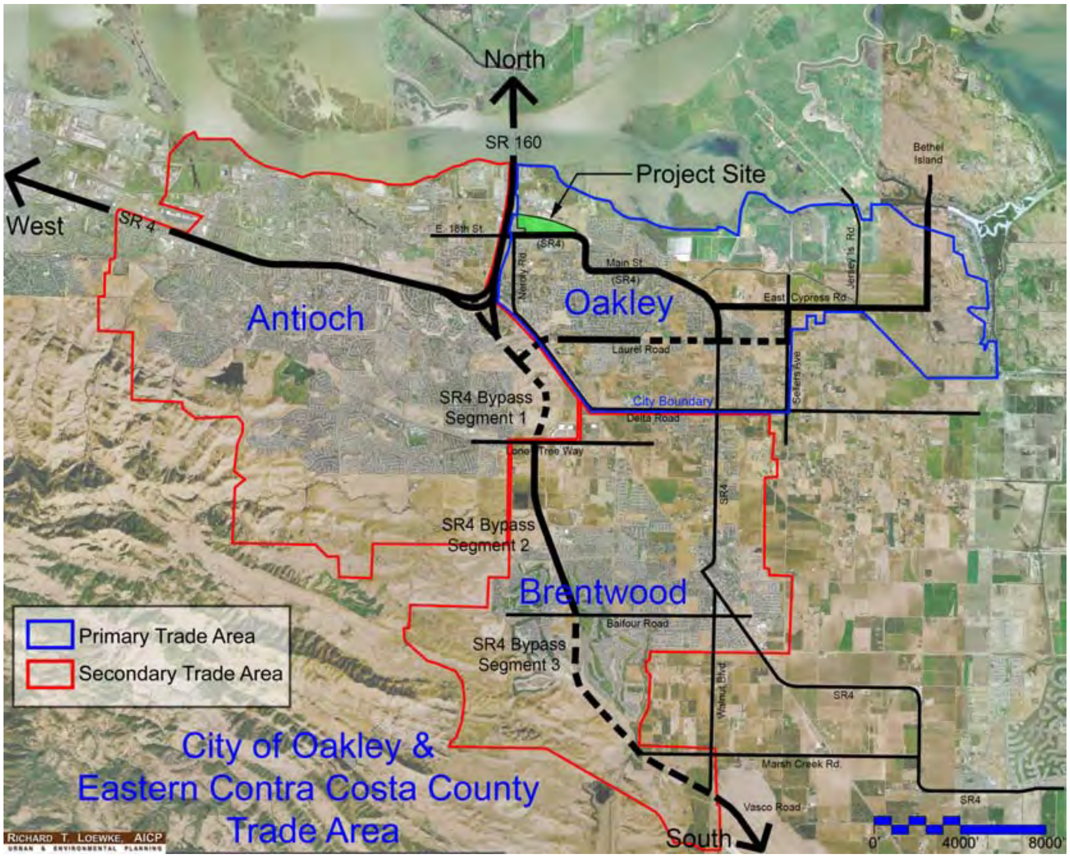
Approach

For purposes of this analysis it is assumed that the project will be phased over a period of five to ten years for full buildout. The two larger big-box users (the supercenter and the home improvement center) are expected to open in 2009, followed by the remaining tenants based on market demand over the next five to ten years. The purpose of this report is not to assess whether the retail market area can support this project, but to assess the impacts of the proposed project assuming that it is constructed as planned. The analysis assumes that this will be a fully functioning center, with all of the project's outlets achieving a level of revenue reflective of the national averages for each sector represented in the project. This is considered a reasonable and defensible basis upon which to evaluate the potential economic impacts of the proposed project. However, if this leads to the conclusion that the center will capture an unrealistic share of local sales in a given category, the analysis considers more likely outcomes, such as both the new outlet and the existing outlets performing below industry benchmarks.

Definition of Analysis Areas

This report uses two areas of analysis: the City of Oakley and a Subregion consisting of the cities of Oakley, Brentwood, and Antioch. A trade area is the geographic region that encompasses most of a retail outlet's customers. For the Proposed Project, the City of Oakley is assumed to be the Primary Trade Area and the Subregion is assumed to be the Secondary Trade Area, based on the assumption that shoppers would tend to go to the major shopping centers closest to their home for most purchases. These definitions are based on the location of other existing and planned competitive supercenters and other major retail nodes, with most shoppers assumed to travel to the nearest supercenter-type store for that type of shopping, and in part on the relative distance and isolation from other major urbanized areas (with the exception of Pittsburg, where retail developments could attract shoppers from the Subregion). There are no existing supercenters in the Subregion, but there are existing Wal-Mart stores with limited grocery offerings in Antioch on Lone Tree Way and in Pittsburg on Loveridge Road, and Target stores in Slatten Ranch in Antioch and in Century Plaza in Pittsburg. Wal-Mart has proposed expanding the

Antioch store to a supercenter format with a full supermarket equivalent, but the Antioch City Council determined not to certify the Final EIR and denied design review approval for the Wal-Mart expansion project. At the time of this analysis, Wal-Mart's future plans for Antioch were unknown, but they may submit a revised proposal for expansion. Obviously, the outcome of this process will affect the potential geographic draw of a supercenter in Oakley, so the analysis in this report considers cumulative impacts with the Antioch supercenter both in place and not in place. Beyond the Subregion, Wal-Mart has plans for Supercenters in Fairfield, Suisun City, Tracy, Lodi, and Vallejo, and has existing Supercenters in Dixon and Stockton. These existing and planned stores, along with the major retail concentrations in Concord and its distance from the Cline Property serve to bracket the potential market area for this Proposed Project.



The Primary Trade Area (called out as "Oakley" throughout this report) is used for most of the anchor store analysis (comprising general merchandise and home improvements) as well as for the undefined retail uses in the absence of detailed information on specific tenants whose market area might not be constrained by the significant region-serving retail concentrations in surrounding areas. Thus for all store categories, the City of Oakley is considered the primary area of analysis. The Subregion will be considered where relevant, for example for assessing the impacts on some stores that are relatively close to the Proposed Project, such as the Antioch Kmart. Retail sales are also analyzed in the Subregion and Contra Costa County in order to provide a benchmark for expected retail sales and the Proposed Project's potential capture from elsewhere within the Subregion. Though there may be some crossing of trade area boundaries by shoppers, designating Oakley as the Primary Trade Area makes the analysis in this report conservative in that most shoppers within the Subregion are excluded from the leakage analysis.

Summary of Demographic and Economic Overview

The Subregion has experienced a moderate population growth at a rate of 4.6 percent between 2000 and 2005, with growth in Oakley following at a slightly slower rate of 3.1 percent. While population growth within the Subregion will continue until 2010 at an average annual rate of 3.6 percent, Oakley's growth will accelerate to 11.2 percent annually. These trends are expected to moderate through 2015, with the Subregion's annual average rate of growth between 2005 and 2015 slowing to 1.8 percent, and Oakley's annual growth averaging a brisk 6.8 percent. This growth should lead to substantial increases in retail expenditures by City residents over the next several years. Household incomes for Oakley and the Subregion were somewhat below Contra Costa County as a whole in 2005 ($83,000 for Oakley and $85,338 for the Subregion, compared to $98,400 for the County). Household income is expected to increase County-wide between 2005 and 2010 by a rate of 1.0 percent annually, while incomes in Oakley and the Subregion will grow by slightly faster annual rates of 1.2 percent and 1.1 percent, respectively.

Retail Sales Trends

Oakley's total taxable retail sales have remained stable on an inflation-adjusted basis while the city's population has grown slowly since 2001. Since 2001, taxable retail sales have ranged from a low of $86.5 million in 2002 to $92.1 million in 2005.[1] Currently, Oakley does not have any large region-serving retail centers, and its limited growth in taxable retail sales with a rising population suggests that surrounding cities are capturing sales from Oakley residents. Only seven percent of the Subregion's $1.4 billion in annual taxable retail sales occur in Oakley, which includes 16 percent of the Subregion's population.

Antioch had a rate of increase in population similar to Oakley, but taxable retail sales climbed 25 percent from $738 million in 2000 to $925 million in 2005. Antioch's sales jumped 11 percent from 2003 to 2004, most likely reflecting the 2003 opening of Slatten Ranch Shopping Center, a large center with multiple big box retailers.

Brentwood's taxable retail sales and population have grown quickly, with taxable retail sales more than doubling from $174 million in 2000 to $360 million in 2005 while its population grew 81 percent during the same period. With several major retailers opening

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[1] All sales in inflation-adjusted 2006 dollars unless otherwise noted.

in recent years and more development in the pipeline, Brentwood has become much more competitive in the regional retail market, challenging Antioch's dominant position.

Oakley's per capita sales illustrate the city's weakness as a retail destination. With 2005 per capita taxable sales of $3,169, Oakley levels are well below Brentwood's per capita sales of $8,546, Antioch's per capita sales of $9,180, and the Subregion's per capita sales of $8,008. Moreover, Oakley's per capita sales have declined since 2001 while the other two cities have shown increases, indicating that Antioch and Brentwood's success is likely due in part to capturing Oakley residents' retail expenditures.

Oakley had only six stores in the general merchandise store category as of January, 2006, and does not have any major stores (e.g., Wal-Mart or Target) in this category. For the Subregion as a whole, Antioch is the dominant city for general merchandise, accounting for 95 percent of the reported taxable sales for this store category

Taxable food store sales in Oakley peaked at $21.1 million in 2002, and since then have declined slightly to $17.7 million in 2005. Antioch's food store sales have also declined, dropping nearly from $61.4 million in 2000 to $51.5 million in 2005. In contrast, Brentwood has increased its taxable food store sales every year since 2000, from $25.8 million in 2000 to $40.7 million in 2005. This loss of sales in Antioch and Brentwood and gain in Brentwood is most likely due to the development of Winco in 2003. Per capita sales taxable food store sales confirm that Brentwood is capturing a relatively large share of the Subregion's sales, due in large part to the presence of WinCo.

The limited data available indicate that that Oakley lags behind in building materials sales relative to Antioch and Brentwood, a gap that has widened considerably with closing of the hardware store in Oakley and the opening on Lone Tree Way of the new Lowe's in Antioch and Home Depot in Brentwood. Brentwood's building materials and farm implements sales rose from $20.2 million in 2000 to $72.8 million in 2005, a 261 percent increase over the six years that largely occurred between 2003 and 2004, when the Home Depot opened. Antioch's building materials store sales have also increased over the same time period, rising 128 percent from $60.2 million in 2000 to $137.0 million in 2005; Antioch is home to four home improvement retail locations that have kept its share of building material sales strong. Antioch and Brentwood both show strong sales, probably due in large part to capture of sales from Oakley.

Direct and Cumulative Economic Impacts

Total project sales at full occupancy and benchmark sales levels are estimated at approximately $272 million dollars annually. Under baseline conditions, sales from leakage and regional capture would not support the project, a strong indicator that sales would be captured from existing stores beyond what is assumed here, or that the project might not perform at industry benchmarks with the baseline population. By 2010, however, Oakley alone could support the supermarket space, and with limited capture from the remainder of the Subregion could support all components except the restaurants and the mixed retail. By 2015, Oakley alone could support most of the retail space in the Proposed Project, and with limited capture from the remainder of the Subregion, the entire project is supportable, assuming a limited amount of space is occupied by non-retail businesses such as banks or personal service businesses. This is consistent with the assumption that the project would build out over a number of years, as Oakley's population grows to a level where these components could be supported.

The Proposed Project alone may have substantial short-term economic impacts at three retail centers in Oakley, as well as at the Kmart in Antioch. The Raley's and Centro Mart face greater risk of closure since these stores are currently performing below industry benchmarks. Cumulatively the Proposed Project in conjunction with the proposed Oakley Safeway could lead to a greater risk of closure of retail buildings for a longer period of time in Oakley. However, the demand analysis indicates that even if one or more of the existing supermarkets closes, long term demand in Oakley should support three supermarkets the size of the existing ones in addition to both the supercenter and the Safeway. For the Subregion, the cumulative impacts of the Proposed Project in combination with other supermarkets could lead to a short-term loss of sales at existing stores. Without the Wal-Mart expansion (including a supermarket-equivalent component) in Antioch, recovery to near current overall sales levels would occur by 2015. If that expansion occurs, the loss of sales at existing stores would be larger, with a slower recovery. Overall levels might be sustainable, but individual stores that are currently underperforming could be at risk of closure. Oakley's supermarket sales should recover as the population increase over the next decade, and Brentwood's strong growth should allow recovery there. Especially if the Wal-Mart expansion occurs, the Albertsons on Lone Tree is at risk of closure due to its poor sales currently and its proximity to Wal-Mart, and a long-term oversupply of supermarket space. Because of this proximity and poor sales performance, the Antioch Wal-Mart expansion alone would place this store at risk of closure even without the Proposed Project in Oakley moving forward.

There is also a strong likelihood that the Antioch Kmart would close in the face of competition from the Proposed Project, especially if cumulative impacts including the possible expansion of the Antioch Wal-Mart and the addition of a JC Penney store are considered. Long term demand from Oakley alone is not great enough to support the general merchandise component of the supercenter along with the Kmart just outside Oakley's city boundary. With the opening of the supercenter in Oakley in combination with the completion of the Highway 4 Bypass, this site loses much of its locational advantage. The other major general merchandise stores in the Subregion are differentiated enough that, in combination with regional growth, there should be no risk of store closure if the Antioch Wal-Mart expands in combination with the Proposed Project's supercenter and the other reasonably foreseeable general merchandise stores planned in the Subregion.

Additional vacancies scattered throughout Oakley could result from defections of tenants to the new center as they seek out the newest space available, and from closure of existing businesses competing with the new center. However, in the absence of a specifically defined tenant mix for the Secondary Retail buildings in the project, any attempt to identify such potential vacancies would be speculative, and growth in the City and the Subregion should sustain reuse of any smaller vacated spaces, which in any case are part of the lifecycle of any retail real estate market. The project impacts might be lessened to some degree to the extent the center develops with a regional retail focus since most existing stores in Oakley are local serving.

Elsewhere in the Subregion, there are no additional plans for competitive home improvement stores for which cumulative effects need to be considered. The other proposed center that has a substantial amount of retail space is the Streets of Brentwood project. As proposed, this will be a "lifestyle" center, catering to a more upscale market niche than the Proposed Project. While it may draw shoppers from throughout the Subregion, including Oakley, it will compete in a different market niche, and the current capture rates for the Proposed Project take into account the likelihood that shoppers from Oakley and elsewhere in the Subregion will shop in other outlets. Furthermore, the continued population growth in Brentwood and the Subregion should create additional overall retail demand that can be absorbed by this project without causing other store closures or long term vacancies.

Findings Regarding Potential for Business Closures and Sustained Vacancies

Cypress Square

The Proposed Project, either alone or in conjunction with the proposed Safeway and other projects including the possible Wal-Mart expansion in Antioch, would result in increased supermarket competition, especially in the short term. This period of increased competition could lead to the closure of Raley's, the anchor at Cypress Square, which currently has sales reported below industry benchmarks. However, by 2010, local demand for supermarkets should increase above existing levels even with the supercenter in place, so even if Raley's closes, another supermarket use, perhaps repositioned to a niche less directly competitive with the supercenter, should be feasible, Additionally, there are "second generation" tenants that brokers active in Oakley note as potential reuses for this space. As a result, this analysis does not indicate a likelihood of sustained long-term vacation of existing building spaces due to the Proposed Project either alone or cumulatively.

Oakley Shopping Center

The Proposed Project, either alone or in conjunction with the proposed Safeway and other projects including the possible Wal-Mart expansion in Antioch, would result in increased supermarket competition, especially in the short term. The main occupant at risk in Oakley Shopping Center is the Centro Mart, since the other tenants are small independent local-serving businesses. This store is underperforming industry benchmarks and is somewhat dated and rundown in appearance. Because of its location (the farthest from the Proposed Project) and smaller size, Centro Mart may be less vulnerable to the

Proposed Project's supermarket impacts than Raley's but it is still at some risk in the short term. The other occupants of the center are local-serving and appear to be tenants that seek low rent. Though it is possible the Centro Mart may be forced to close due to near-term competition from the Proposed Project, by 2010 local demand for supermarkets is expected to increase above existing levels even with the supercenter in place. Even if the Centro Mart closes, another supermarket use, perhaps repositioned to a niche less directly competitive with the supercenter, should be feasible. However, like the Centro Mart itself, this center is somewhat antiquated and rundown in appearance. Additional competitive pressure, from either the Proposed Project or cumulative retail expansion, could result in the loss of tenants and reduced aggregate revenues, potentially placing a greater financial burden on the management of this center to address maintenance of the facilities over time.

Oakley Town Center

The Proposed Project, either alone or in conjunction with the proposed Safeway and other projects including the possible Wal-Mart expansion in Antioch, would result in increased supermarket competition, especially in the short term. Additionally, the Rite Aid store, as the only significant general merchandise store operating in Oakley, may also see competitive pressure from the supercenter, but as a smaller store will offer a convenience level not attainable by the supercenter; and should survive, especially as Oakley's population increases. The Albertsons in the center is estimated to be performing above industry benchmarks, however, and as a result is less likely to face closure in the short term than either the Raley's or Centro Mart. Furthermore, by 2010, local demand for supermarkets should increase above existing levels even with the supercenter in place. As a result, this analysis does not indicate a likelihood for sustained long-term vacation of existing building spaces due to the Proposed Project either alone or cumulatively.

Big Kmart

The Big Kmart located in Antioch is in close proximity to the Proposed Project, less than one-half mile from the project site. This store faces many challenges given the proximity to the Proposed Project. Additionally, the cumulative impacts of the Proposed Project in conjunction with an expansion of the Wal-Mart Supercenter on Lone Tree Way in Antioch could greatly reduce the market share for this store. Though additional supportable square feet of general merchandise stores in Oakley exceeds the size of the general merchandise component of the proposed supercenter in 2010 and 2015, it is not equivalent to the size of this existing store, and in fact relies on capture of some of its sales from residents of Antioch and Brentwood. Kmart's sales base will likely erode and could potentially cause the store to close.

The site is a larger single user site that would not be encumbered with legacy retail tenants that could hinder redevelopment, and could perhaps be reused as retail or in some other commercial or even industrial use. However, there are a limited number of users seeking this size of space, and this site loses much of its retail locational advantage (i.e., proximity to Oakley) if the Proposed Project is constructed. The site does have high visibility due to its location adjacent to a highway exit, but this advantage will be somewhat diminished subsequent to the completion of the Highway 4 Bypass, which will direct many commuters away from this interchange. Though this site has potential for other reuse due to its visibility and access, there remains the potential for closure of the Big Kmart use and long-term vacancy of the building.

Other Locations

The other potential closure indicated by the impacts analysis is the Albertsons on Lone Tree Way on Antioch under a cumulative impacts scenario, most notably if the Wal-Mart expansion nearby ultimately occurs following reapplication with the City of Antioch. However, the risk of closure is linked almost entirely to that expansion moving forward rather than from impacts of the Proposed Project. If that store closes, the overall Subregion retail market and regional growth should lead to reuse with either another supermarket or a “second generation” user. Alternatively, the purchase of this Albertsons and others by Save Mart indicates that the store may be repositioned to be more competitive. In either case, long-term vacancy is not a likely outcome.

Introduction

Background and Study Purpose

The Cline Property owners are working with the City of Oakley to prepare a specific plan for development of the Cline Property. As part of its evaluation of the proposed specific plan, the City of Oakley has retained Richard T. Loewke, AICP to complete an Environmental Impact Report (EIR). Recent California court decisions (*Bakersfield Citizens for Local Control v. City of Bakersfield, Panama 99 Properties LLC, and Castle & Cooke Commercial-CA, Inc.*, as well as *Dolan Ingram, et al. v. City of Redding and Wal-Mart, Inc, et al.*) have made clear that for large retail developments, an economic impact analysis should be undertaken to assess the possibility of "urban decay" and deterioration and indirect physical impacts on the environment. In the Bakersfield decision, the Appellate Court made clear that such an impact needed to be given "meaningful consideration." Both cases indicate that to fully satisfy the requirements of an EIR, the analysis must start with the economic impacts, but also follow the causal chain to assess the likelihood of new retail space causing existing space to become vacant, and following that outcome, determine the potential for urban decay and physical deterioration of existing retail centers and nodes. The City of Oakley has retained Bay Area Economics (BAE) to undertake an economic impact analysis as part of the EIR process for this project. BAE aims to use the best available information to assess the economic impacts and then establish whether these economic impacts might result in closure of existing businesses and sustained long-term vacancy of buildings, which could lead to a negative effect on the physical environment of Oakley and the surrounding communities as manifested by urban decay and physical deterioration of existing retail centers. The potential for urban decay and physical deterioration within existing retail centers, however, may ultimately be influenced by additional mitigating factors. These include existing municipal programs which provide economic incentives for maintenance of buildings and facilities, and attraction of replacement uses, as well as direct mitigation measures incorporated into the Specific Plan EIR. The Draft EIR analyzes all of these factors in combination and makes a reasoned judgment as to the actual potential for urban decay and physical deterioration.

Project Description

The City of Oakley and its Redevelopment Agency sponsored the preparation of the Cline Property Specific Plan (referred to in this report as the "Specific Plan") guiding future development on the Cline property (the "Proposed Project") located along the north side of Main Street, east of Bridgehead Road at Oakley's westerly entrance from Highway 160. The Draft Specific Plan incorporates a Development Plan accommodating three to four principal building sites for major retail uses ranging from approximately 120,000 to approximately 230,000 square feet of gross floor area (GFA). The Specific Plan authorizes a development range of from 630,000 square feet (Lower Intensity Alternative 2) to 770,000 square feet (Higher Intensity Alternative 1). This Higher Intensity alternative has been used for analysis of Project impacts in the DEIR because it represents the maximum potential aggregate development, including the maximum anchor (Major Retailers) and maximum additional store (Secondary Retailers) spaces. The Proposed Project is modeled after Alternative 1 (Higher Intensity) of the Specific Plan and consists of a mix of retail space configurations in several large buildings and free-standing pads, including three anchor spaces of 120,000 square feet or larger, additional store spaces ranging from 4,000 to 90,000 square feet, and several pad spaces suitable primarily for restaurants (see Table 1). At this time, there are no committed tenants but the assumed anchor tenants are a large-format 230,000 square foot general merchandise discount supercenter inclusive of approximately 65,000 square feet of supermarket-equivalent use[1] and also providing sales of garden, and other goods and services typically found in a large store of this type; a 170,000 square foot home improvement center; a third approximately 120,000 square foot big box retailer such as a large apparel or durable goods store; up to an additional 220,000 square feet of general retail use including restaurants; and one hotel providing up to 75 rooms (30,000 square foot maximum under the Specific Plan's Higher Intensity Alternative 1). The Specific Plan provides an option for replacement of the hotel use with an equivalent amount of retail space. This report does not address the market absorption issues associated with a hotel use, since its development is assumed to be directly tied to growth in demand from future business activity. Instead, this analysis focuses on the proposed project's retail sales potential in the current and future market and any potential business closure and long-term vacancy impacts associated with the retail development. The use of the Higher Intensity alternative with a discount general merchandise supercenter allows for an analysis of a "worst case" scenario with respect to potential business closures and long-term vacancies.

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[1] For purposes of the retail analysis the approximately 165,000 square feet of general merchandise retail (including garden center) will be treated separately from the approximately 65,000 square foot of supermarket-equivalent use. This supermarket equivalent use is based on approximately 50,000 square feet dedicated to food items directly in the form of sales floor, storage, and prep areas, along with a share of common areas such as checkouts and customer service, as well as some general merchandise space, since there is some overlap between a discount supercenter and a major supermarket in terms of items stocked (e.g., small housewares or paper products) and thus competition for customers. This is especially true in Oakley, where there are very limited options for purchase of these items locally except in supermarkets. It should be noted, however, that this is only a reasonable estimate of the product mix and layout of a supercenter-type store; actual store layout may vary somewhat from what is assumed here. However, as indicated in the analysis below, this variation would not materially affect the conclusions of this report.

Table 1: Proposed Project Development Information

Location	Type	Square Feet	Tenant
Major A	General Merchandise/Grocery	230,000	Discount Supercenter
Major B	Building Materials	170,000	Home Improvement Center
Major C	Apparel/Durable Goods	120,000	Big Box Apparel/Durable Goods
Total Major Area		**520,000**	
Total Shops Area		**220,000**	Misc Retail/Services
Total Retail Area		**740,000**	
Hotel		**30,000**	
Total Center Store Area		**770,000**	

All sizes are approximate. A fourth big box of up to 100,000 square feet may be accommodated by redistributing the square footage within Major Retail Pads A, B and C.

Sources: Richard Loewke; City of Oakley; Bay Area Economics, 2007.

Approach

For purposes of this analysis it is assumed that the project will be phased over a period of five to ten years for full buildout. The two larger big-box users (the supercenter and the home improvement center) are expected to open in 2009, followed by the remaining tenants based on market demand over the next five to ten years. The purpose of this report is not to assess whether the retail market area can support this project, but to assess the impacts of the proposed project assuming that it is constructed as planned. The analysis assumes that this will be a fully functioning center, with all of the project's outlets achieving a level of revenue reflective of the national averages for each sector represented in the project. This is considered a reasonable and defensible basis upon which to evaluate the potential economic impacts of the proposed project. However, if this leads to the conclusion that the center will capture an unrealistic share of local sales in a given category, the analysis considers more likely outcomes, such as both the new outlet and the existing outlets performing below industry benchmarks.

Population and Employment Overview

Introduction

This section presents background information on current and projected demographic and economic conditions in Oakley and the larger Subregion.

Developing an economic and demographic profile of these areas will provide background information to assist in estimating future retail sales in the areas and in assessing the potential impacts of the Proposed Project on other retail outlets and centers. Data sources include the U.S. Census Bureau, including the 2000 Census and the 2002 Census of Retail Trade, the California Employment Development Department (EDD), and projections from the Association of Bay Area Governments (ABAG). Projections for the City of Oakley come from City staff and are based on approved residential development not accounted for in ABAG's projections.

Definition of Analysis Areas

This report uses two areas of analysis: the City of Oakley and a Subregion consisting of the cities of Oakley, Brentwood, and Antioch. A trade area is the geographic region that encompasses most of a retail outlet's customers. For the Proposed Project, the City of Oakley is assumed to be the Primary Trade Area and the Subregion is assumed to be the Secondary Trade Area, based on the assumption that shoppers would tend to go to the major shopping centers closest to their home for most purchases (see Figure 1 for project site vicinity). These definitions are based on the location of other existing and planned competitive supercenters and other major retail nodes, with most shoppers assumed to travel to the nearest supercenter-type store for that type of shopping, and in part on the relative distance and isolation from other major urbanized areas (with the exception of Pittsburg, where retail developments could attract shoppers from the Subregion). There are no existing supercenters in the Subregion, but there are existing Wal-Mart stores with limited grocery offerings in Antioch on Lone Tree Way and in Pittsburg on Loveridge Road, and Target stores in Slatten Ranch in Antioch and in Century Plaza in Pittsburg. Wal-Mart has proposed expanding the Antioch store to a supercenter format with a full supermarket equivalent, but the Antioch City Council determined not to certify the Final EIR and denied design review approval for the Wal-Mart expansion project. At the time of this analysis, Wal-Mart's future plans for Antioch were unknown, but they may submit a revised proposal for expansion. Obviously, the outcome of this process will affect the potential geographic draw of a supercenter in Oakley, so the analysis in this report considers cumulative impacts with the Antioch supercenter both in place and not in place. Beyond the Subregion, Wal-Mart has plans for Supercenters in Fairfield, Suisun City, Tracy, Lodi, and Vallejo, existing Supercenters in Dixon and Stockton. These existing and planned stores, along with the major retail concentrations in Concord and its distance from the Cline Property serve to bracket the potential market area for this Proposed Project.

The Primary Trade Area (called out as "Oakley" throughout this report) is used for most of the anchor store analysis (comprising general merchandise and home improvements) as well as for the undefined retail uses in the absence of detailed information on specific tenants whose market area might not be constrained by the significant region-serving retail concentrations in surrounding areas. Thus for all store categories, the City of Oakley is considered the primary area of analysis. The Subregion will be considered where relevant, for example for assessing the impacts on some stores that are relatively close to the Proposed Project, such as the Antioch Kmart. Retail sales are also analyzed in the Subregion and Contra Costa County in order to provide a benchmark for expected retail sales and the Proposed Project's potential capture from elsewhere within the Subregion. Though there may be some crossing of trade area boundaries by shoppers, designating Oakley as the Primary Trade Area makes the analysis in this report conservative in that most shoppers within the Subregion are excluded from the leakage analysis.

Figure 1: Project Site Vicinity

Population Trends

Short-Term Trends

Oakley's population has been increasing at an average annual rate of 3.1 percent, from 25,619 persons in 2000 to an estimated 29,800 persons in 2005. Based on existing development approvals (as shown in Appendix G), the City of Oakley projects that Oakley's growth will reach nearly seven percent annually from 2005 to 2015.[2] The Subregion's population, which has grown at a consistently strong rate since 1990, will slow in the next few years to an average annual rate of 3.6 percent (see Table 2). Based on estimates from the Association of Bay Area Governments (ABAG) for Antioch and Brentwood combined with Oakley's own projections, the Subregion gained 35,047 persons from 2000 to 2005; with an additional 52,800 persons expected by 2015, the Subregion's population is projected to reach 227,300 persons.

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[2] By comparison, Brentwood grew at an annual rate of 12.6 percent annually between 2000 and 2005, based on State Department of Finance population estimates.

Table 2: Population Trends, 1990-2015

Population	1990	2000	Average Annual Change 1990-2000	2005	Average Annual Change 2000-2005	2010	Average Annual Change 2005-2010	2015	Average Annual Change 2005-2015
Oakley (a)	18,374	25,619	3.4%	29,800	3.1%	50,600	11.2%	57,300	6.8%
Subregion (b)	88,132	139,453	4.7%	174,500	4.6%	207,900	3.6%	227,300	1.8%
Contra Costa County (c)	803,732	948,816	1.7%	1,023,400	1.5%	1,061,900	0.7%	1,107,300	0.8%
State of California (d)	29,760,021	33,871,648	1.3%	36,644,983	1.6%	39,246,767	1.4%	41,485,408	1.1%

(a) Projections for the City of Oakley are from City of Oakley staff.
(b) Subregion consists of Oakley, Antioch, and Brentwood. 2005, 2010, and 2015 from ABAG.
(c) 2005, 2010, and 2015 from ABAG. 2005 number is within two percent of DOF estimate.
(d) 2005 and 2010 from DOF. 2015 estimated based on DOF P-1 data.

Sources: 1990 & 2000 U.S. Census; Association of Bay Area Governments (ABAG) *Projections 2007*; City of Oakley, 2006; BAE, 2007.

Long Term Trends

The City of Oakley projects, based on existing development approvals, that Oakley will grow significantly faster than the Subregion, especially neighboring Antioch (see Table 3). Growing at an annual rate of 3.4 percent, Oakley is projected to reach 69,100 persons in 2030, while Antioch will increase at an annual rate of 0.8 percent to 124,000 persons in 2030[3]. Brentwood will experience strong growth to 82,900 persons in 2030. Relative to Contra Costa County with an annual rate of 0.8 percent, the Subregion will grow at a faster rate of 1.9 percent per year to 276,000 persons in 2030.

Table 3: Population Projections

Population	2000	2005	2010	2020	2030	Annual % Change 2005-2030
Oakley	25,619	29,800	50,600	64,900	69,100	3.4%
Antioch	90,532	101,500	106,000	115,000	124,000	0.8%
Brentwood	23,302	43,200	51,300	67,400	82,900	2.6%
Subregion (a)	139,453	174,500	207,900	247,300	276,000	1.9%
Contra Costa County	948,816	1,023,400	1,061,900	1,157,000	1,255,300	0.8%

(a) Projections for the City of Oakley are from City of Oakley staff. All other projections are from ABAG.
(b) Subregion consists of Antioch, Brentwood, and Oakley.

Sources: Association of Bay Area Governments (ABAG) *Projections 2007*; City of Oakley, 2006; BAE, 2007.

Household Trends

Household Growth

As shown in Table 4, the rates of household growth in Oakley and the Subregion closely match the respective population growth rates of the two areas. Oakley households will increase from

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[3] Population projections for City Spheres of Influence, which include surrounding unincorporated areas that may ultimately become part of the cities.

9,300 to 17,900 households in 2015. The Subregion contains an estimated 55,920 households as of 2005, with an additional 17,890 households expected by 2015.

Table 4: Household Trends, 1990-2015

Households	1990	2000	Average Annual Change 1990-2000	2005	Average Annual Change 2000-2005	2010	Average Annual Change 2005-2010	2015	Average Annual Change 2005-2015
Oakley	5,907	7,832	2.9%	9,300	3.5%	15,770	11.1%	17,900	6.8%
Subregion (a)	29,783	44,667	4.1%	55,920	4.6%	66,970	3.7%	73,810	2.8%
Contra Costa County	300,288	344,129	1.4%	368,310	1.4%	385,400	0.9%	405,420	1.0%

Notes:
(a) Projections for the City of Oakley are from City of Oakley staff.
(b) Subregion consists of Oakley, Antioch, and Brentwood. 2005, 2010, and 2015 from ABAG.

Sources: 1990 & 2000 U.S. Census; Association of Bay Area Governments (ABAG) *Projections 2007*; City of Oakley, 2006; BAE, 2007.

Household Income

Household incomes and resulting consumer buying power are key factors in assessing the potential for additional retail development. Based on ABAG's *Projections 2007*, relative to Contra Costa County's 2005 mean household income of $98,400 (all incomes in constant 2005 dollars), the Subregion had a lower mean income of $85,338 (see Table 5). Oakley's 2005 mean income was estimated at $83,000. From 2005 to 2010, the Subregion's mean household income is projected to grow slightly, at a rate of 1.1 percent per year, slightly below the rate estimated for Oakley and above the rate for the County and the Bay Area. Between 2000 and 2005, with the exception of the Subregion, all geographies listed with the exception of the Subregion showed a decline in mean household income; for the Subregion there was a very slight rise.

Table 5: Mean Household Income

Households	2000	2005	Average Annual Change 2000-2005	2010	Average Annual Change 2005-2010
Oakley (a)	$84,800	$83,000	-0.4%	$88,200	1.2%
Subregion (b)	$84,018	$85,338	0.3%	$90,099	1.1%
Contra Costa County	$100,500	$98,400	-0.4%	$103,400	1.0%
ABAG Region (c)	$104,000	$97,400	-1.3%	$102,100	0.9%

Notes: In constant 2005 dollars.
(a) Sphere of influence, which is a slightly larger area than the incorporated City.
(b) Subregion consists of the spheres of influence for Antioch, Brentwood, and Oakley.
(c) Nine-county ABAG region includes Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties.

Sources: Association of Bay Area Governments (ABAG) *Projections 2007*; BAE, 2007.

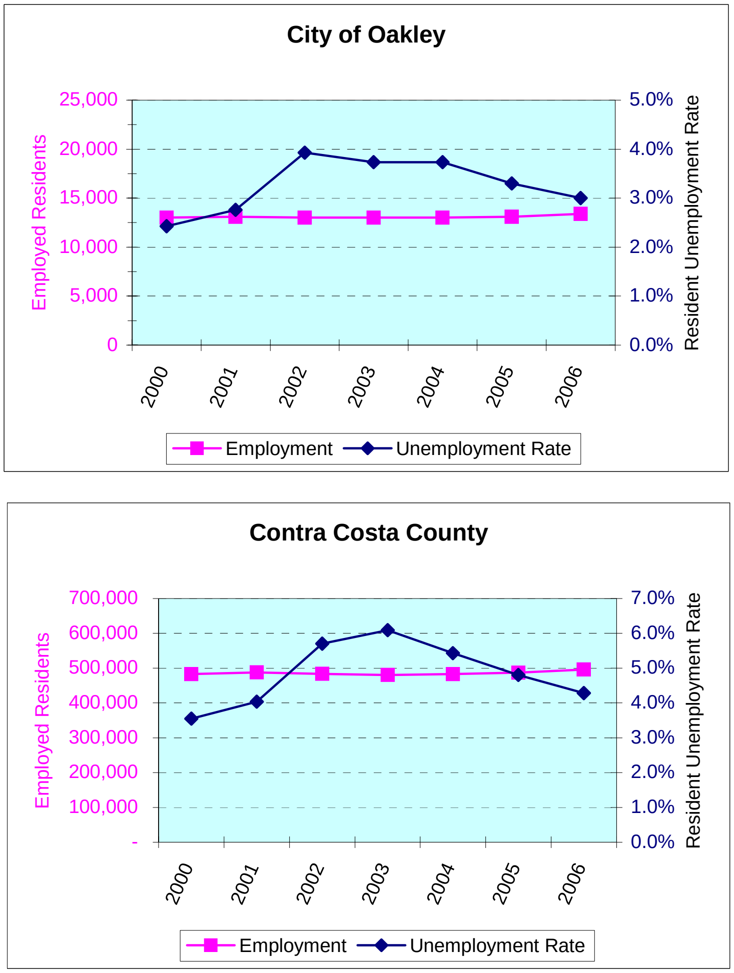
Labor Force Trends

Employment can be an indicator of regional buying power; unemployed workers and their households will have reduced incomes and lower expenditures. Growth in the employed labor force of an area can indicate increased buying power. Contra Costa County has maintained a very steady number of employed residents despite the ups and downs of the Bay Area economy since 2000. As shown in Figure 2 and Appendix A, the number of employed residents has remained between 483,000 and 496,300 persons since 2000. Unemployment climbed from 3.5 percent in 2000 to 6.1 percent in 2003, with a decline to 4.3 percent in 2006. Oakley has experienced a much lower unemployment rate over the same period, with unemployment at 2.4 percent in 2000 increasing to 3.9 percent in 2002 and declining back to 3.0 percent in 2006. On an annual average basis, there were 13,400 employed Oakley residents in 2006.

Summary of Demographic and Economic Overview

The Subregion has experienced a moderate population growth of 4.6 percent annually between 2000 and 2005, with growth in Oakley following at a slightly slower annual rate of 3.1 percent. While population growth within the Subregion will continue until 2010 at an average annual rate of 3.6 percent, Oakley’s growth will accelerate to 11.2 percent annually. These trends are expected to moderate through 2015, with the Subregion’s average annual rate of growth between 2005 and 2015 slowing to 1.8 percent, and Oakley’s annual growth rate averaging a brisk 6.8 percent. This growth should lead to substantial increases in retail expenditures by City residents over the next several years. Household incomes for Oakley and the Subregion were somewhat below Contra Costa County as a whole in 2005 ($83,000 for Oakley and $85,338 for the Subregion, compared to $98,400 for the County). Household income is expected to increase County-wide between 2005 and 2010 by a rate of 1.0 percent annually, while incomes in Oakley and the Subregion will grow by slightly faster annual rates of 1.2 percent and 1.1 percent, respectively.

Figure 2: Employed Residents and Unemployment Rate



Data presented are for residents of the area by place of residence, not workers by place of work. Annual data are annual averages. For detailed data, see Appendix A.

Sources: California Employment Development Department; Bay Area Economics, 2007.

Retail Sales Analysis

This section examines retail trends in Oakley, Antioch, Brentwood, and Contra Costa County. The analysis covers the major retail uses considered for the Proposed Project. While the specific retailer types for much of the center are undetermined, the categories of retail use that might locate in the Proposed Project are discussed. Overall retail sales trends in Oakley, Antioch, and Brentwood are examined, as are trends by major store category including general merchandise stores, food stores, restaurants, and building materials stores. Summing up this analysis is a leakage and supportable square footage analysis for Oakley and the Subregion, focusing on the store categories above and on other store types that might locate in the Proposed Project.

Overall Retail Sales

As shown in Figure 3, Oakley's total taxable retail sales[4] have remained stable on an inflation-adjusted basis while the city's population has grown slowly since 2001. Since 2001, taxable retail sales have ranged from a low of $86.5 million in 2002 to $92.1 million in 2005.[5] As the County's youngest city, Oakley incorporated in 1999; detailed taxable sales data for Oakley are unavailable before 2001. Currently, Oakley does not have any large region-serving retail centers, and its limited growth in taxable retail sales with a rising population suggests that surrounding cities are capturing sales from Oakley residents. This situation could change with the approved Safeway retail center on Laurel and O'Hara, the Proposed Project, and other small commercial developments in the pipeline.

Antioch had a rate of increase in population similar to Oakley, but taxable retail sales climbed 25 percent from $738 million in 2000 to $925 million in 2005 (see Figure 4). Antioch's sales jumped 11 percent from 2003 to 2004, most likely reflecting the 2003 opening of Slatten Ranch Shopping Center, a 430,000 square foot retail center anchored by Target, Barnes & Noble, Mervyns and other big-box retailers. As the home to a new Lowe's and Somersville Towne Center, the only traditional mall in the area, Antioch has established itself with the most region-serving retail in the Subregion. However, although Antioch's sales trends suggest the market is growing quickly, the rapid emergence of neighboring Brentwood and now Oakley as competing retail centers will most likely challenge Antioch's future retail sales growth.

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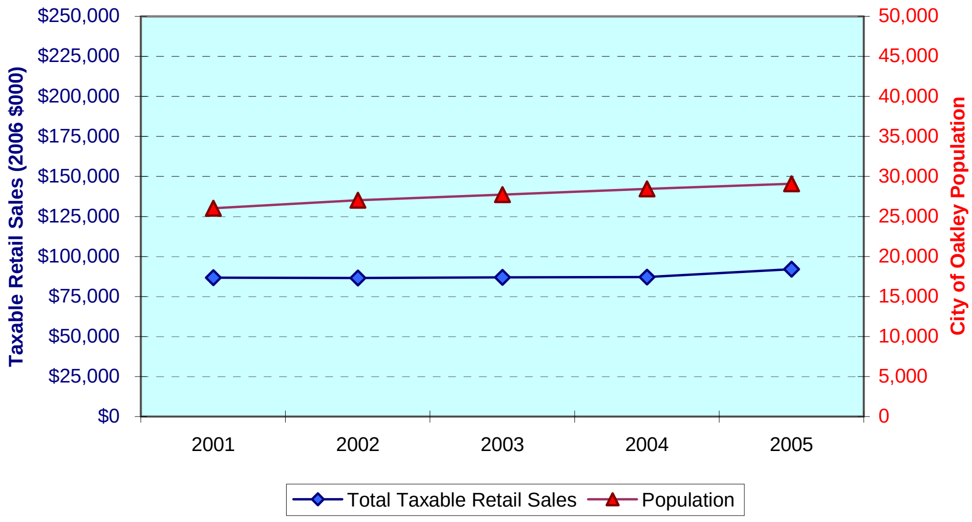
[4] In California, the State Board of Equalization provides retail sales data by store type for most counties and for larger cities. This is the most up-to-date and reliable source available, but it only includes taxable sales. Most food items, prescription drugs, and certain other items are exempt from sales tax, so the reported taxable sales data excludes these non-taxable sales. Later in this section of the report, taxable sales as a proportion of total sales in supermarkets will be assessed.

[5] All sales in inflation-adjusted 2006 dollars unless otherwise noted.

Figure 3: Oakley Taxable Retail Sales and Population, 2001-2005



Notes: Population data from State Department of Finance. May vary from other sources. Sales here are taxable sales only, and exclude most food sales as well as prescription drugs and certain other items. Sales are presented in 2006 dollars. For details, see Appendix B-1.

Sources: State Board of Equalization; U.S. Bureau of Labor Statistics; 2000 U.S. Census; State Department of Finance; State Division of Labor Statistics and Research; Bay Area Economics, 2007.

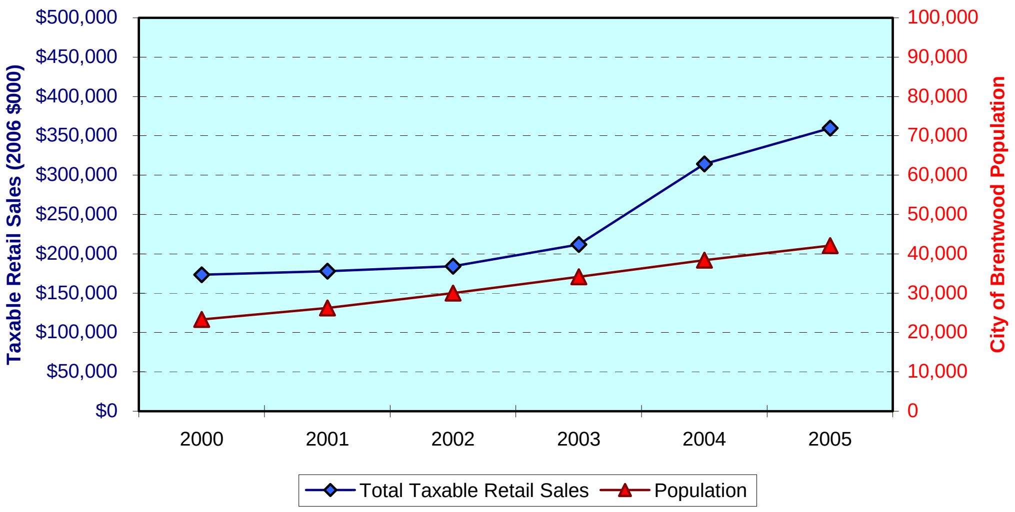
Figure 4: Antioch Taxable Retail Sales and Population, 2000-2005

Notes: Population data from State Department of Finance. May vary from other sources. Sales here are taxable sales only, and exclude most food sales as well as prescription drugs and certain other items. Sales are presented in 2006 dollars. For details, see Appendix B-2.

Sources: State Board of Equalization; U.S. Bureau of Labor Statistics; 2000 U.S. Census; State Department of Finance; State Division of Labor Statistics and Research; Bay Area Economics, 2007.

In contrast to the slower pace of its neighbors, Brentwood's taxable retail sales and population have grown quickly, with taxable retail sales more than doubling from $174 million in 2000 to $360 million in 2005 (see Figure 5). During the same time period, Brentwood's population grew 81 percent, from 23,302 in 2000 to 42,108 in 2005. Two recently opened retail centers most likely account for the 49 percent increase in taxable retail sales in Brentwood from 2003 to 2004; the WinCo center opened in 2003 and Lone Tree Plaza, with a Home Depot, Kohl's, Sports Authority, and other stores, opened in 2004. With over 4,000 housing units already approved or under construction as of July 1st, 2006, the 450,000 square foot Streets of Brentwood expected to build out over the next several years, and several other retail projects in the pipeline, Brentwood has become much more competitive in the regional retail market, challenging Antioch's dominant position.

Figure 5: Brentwood Taxable Retail Sales and Population, 2000-2005



Notes: Population data from State Department of Finance. May vary from other sources. Sales here are taxable sales only, and exclude most food sales as well as prescription drugs and certain other items. Sales are presented in 2006 dollars. For details, see Appendix B-3.

Sources: State Board of Equalization; U.S. Bureau of Labor Statistics; 2000 U.S. Census; State Department of Finance; State Division of Labor Statistics and Research; Bay Area Economics, 2007.

A comparative examination of 2005 taxable retail sales indicates Oakley's overall weakness as a retail destination (see Table 6). Only seven percent of the Subregion's $1.4 billion in annual taxable retail sales occur in Oakley, which includes 16 percent of the Subregion's population.

Table 6: Comparative Taxable Retail Sales, 2005

Sales in 2006 $1,000 (a) (b) (c)	**Oakley**	**Antioch**	**Brentwood**	**Subregion**	**Contra Costa County**	**California**
Apparel Stores	$95	$33,672	$24,884	$58,651	$465,876	$19,441,769
General Merchandise Stores	#	$262,839	$14,920	$277,758	$1,899,782	$59,001,460
Food Stores	$17,736	$51,460	$40,700	$109,896	$626,638	$21,952,333
Eating and Drinking Places	$14,287	$94,947	$40,869	$150,103	$1,082,766	$48,222,627
Home Furnishings and Appliances	$3,913	$27,299	$19,240	$50,452	$499,497	$18,066,743
Building Materials and Farm Implements	#	$136,953	$72,800	$209,753	$1,127,503	$41,203,905
Auto Dealers and Auto Supplies	$7,130	$144,299	$56,483	$207,912	$1,917,496	$76,471,319
Service Stations	$26,947	$80,996	$51,310	$159,253	$1,077,321	$40,070,377
Other Retail Stores	$22,005	$92,122	$38,671	$152,798	$1,698,187	$66,031,512
Retail Stores Total	**$92,112**	**$924,588**	**$359,876**	**$1,376,575**	**$10,395,066**	**$390,462,045**

Sales per Capita in 2006 $ (c)	**Oakley**	**Antioch**	**Brentwood**	**Subregion**	**Contra Costa County**	**California**
Apparel Stores	$3	$334	$591	$341	$457	$529
General Merchandise Stores	#	$2,610	$354	$1,616	$1,862	$1,606
Food Stores	$610	$511	$967	$639	$614	$597
Eating and Drinking Places	$491	$943	$971	$873	$1,061	$1,312
Home Furnishings and Appliances	$135	$271	$457	$294	$490	$492
Building Materials and Farm Implements	#	$1,360	$1,729	$1,220	$1,105	$1,121
Auto Dealers and Auto Supplies	$245	$1,433	$1,341	$1,210	$1,879	$2,081
Service Stations	$927	$804	$1,219	$926	$1,056	$1,091
Other Retail Stores	$757	$915	$918	$889	$1,664	$1,797
Retail Stores Total (b)	**$3,169**	**$9,180**	**$8,546**	**$8,008**	**$10,187**	**$10,627**
Population	**29,068**	**100,714**	**42,108**	**171,890**	**1,020,384**	**36,743,186**

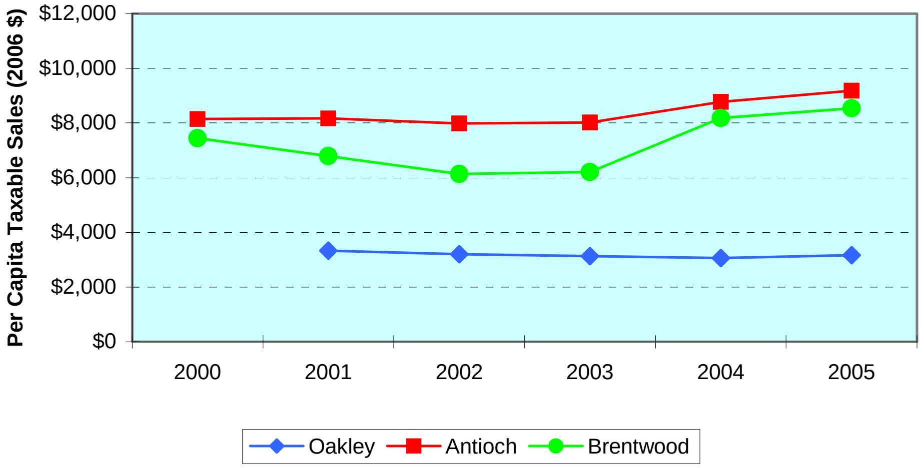
Notes:
(a) Retail sales have been adjusted to 2006 dollars using the Bay Area Consumer Price Index for All Urban Consumers, published by the U.S. Bureau of Labor Statistics. California uses the statewide inflators published by the State Division of Labor Statistics and Research.
(b) Analysis excludes all non-retail outlets (business and personal services) reporting taxable sales.
(c) A "#" sign indicates data supressed to preserve confidentiality due to four or fewer outlets or sales of more than 80% of the category in one store. Suppressed sales have been combined with Other Retail Stores.

Sources: State Board of Equalization; U.S. Bureau of Labor Statistics; State Department of Finance; State Division of Labor Statistics and Research; Bay Area Economics, 2007.

Overall Per Capita Taxable Retail Sales

Per capita retail sales are another indicator of the relative strength of a city as a retail destination; other factors being equal, higher per capita sales relative to the region point toward attraction of shoppers from outside the city. As shown in Figure 6 and Table 6, Oakley's per capita sales illustrate the city's weakness as a retail destination. With 2005 per capita taxable sales of $3,169, Oakley levels are well below Brentwood's per capita sales of $8,546, Antioch's per capita sales of $9,180, and the Subregion's per capita sales of $8,008. Moreover, Oakley's per capita sales have declined since 2001 while the other two cities have shown increases, indicating that Antioch and Brentwood's success is likely due in part to capturing Oakley residents' retail expenditures. While Antioch has historically dominated the Subregion's retail market, Brentwood has seen a steep rise in taxable sales in many categories, and as of 2005 has higher taxable per capita sales than Antioch in all store categories except general merchandise and automotive-related retail outlets.

Figure 6: Comparative Analysis, Per Capita Taxable Retail Sales



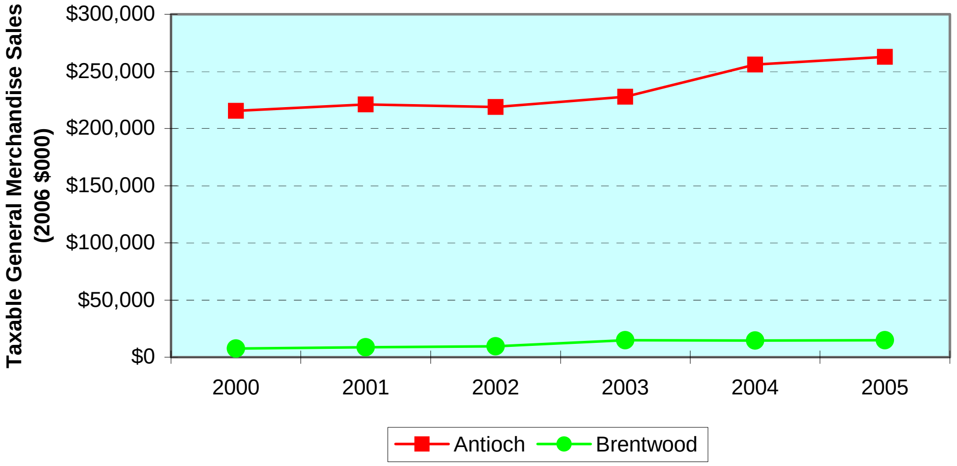
Notes: Population data from State Department of Finance. May vary from other sources. Sales here are taxable sales only, and exclude most grocery sales as well as prescription drugs and certain other items. Sales are presented in 2006 dollars. For details, see Appendices B-1, B-2, and B-3.

Sources: State Board of Equalization; U.S. Bureau of Labor Statistics; 2000 U.S. Census; State Department of Finance; State Division of Labor Statistics and Research; Bay Area Economics, 2007.

General Merchandise Store Sales

In order to protect the confidentiality of sales data for individual stores, where there are four or few outlets or one outlet has 80 percent or more of sales, the State Board of Equalization does not disclose data for a retail store category. As a result, general merchandise store taxable sales data for Oakley are not published. Oakley had only six stores in this category as of January, 2006, and does not have any major stores (e.g., Wal-Mart or Target) in this category. It is likely then that over 80 percent of the sales occur at the Rite-Aid, making it the only significant general merchandise store in Oakley. For the Subregion as a whole, Antioch is the dominant city for general merchandise, accounting for 95 percent of the reported taxable sales for this store category (see Figure 7 and Table 6). While Brentwood has gained overall in retail sales, it still does not have a major general merchandise store. Antioch's dominance is also reflected in general merchandise store per capita taxable sales, where Antioch shows annual per capita taxable sales in this category of $2,610 contrasted with only $354 for Brentwood; Antioch is also well above the County at $1,862 and the state at $1,606.

Figure 7: Taxable Sales Trends for General Merchandise Stores in Brentwood and Antioch, 2000-2005



Notes: Sales here are taxable sales only, and exclude most grocery sales as well as prescription drugs and certain other items. General merchandise sales data for Oakley is unavailable due to disclosure rules. For details, see Appendices B-1, B-2, and B-3.

Sources: State Board of Equalization; U.S. Bureau of Labor Statistics; 2000 U.S. Census; State Department of Finance; State Division of Labor Statistics and Research; Bay Area Economics, 2007.

Food Store Sales

Historically, food store sales tended to be locally driven, with stores often located in neighborhood-serving retail centers and serving trade areas limited largely by proximity to consumers seeking everyday convenience purchases. This traditional role of food stores has changed as supermarkets have become larger, and as more specialized stores such as warehouse-format stores have developed. Stores such as Costco, Wal-Mart Supercenters, and WinCo tend to encourage more pantry-loading, with customers coming from a larger trade area. In fact, the rise of stores such as Costco and Wal-Mart Supercenters appears to be shifting sales away from conventional food stores entirely. Further changing the food store retailing environment is the rise of specialty supermarkets such as Whole Foods and Trader Joe's, which cater to an upscale clientele from a larger region.

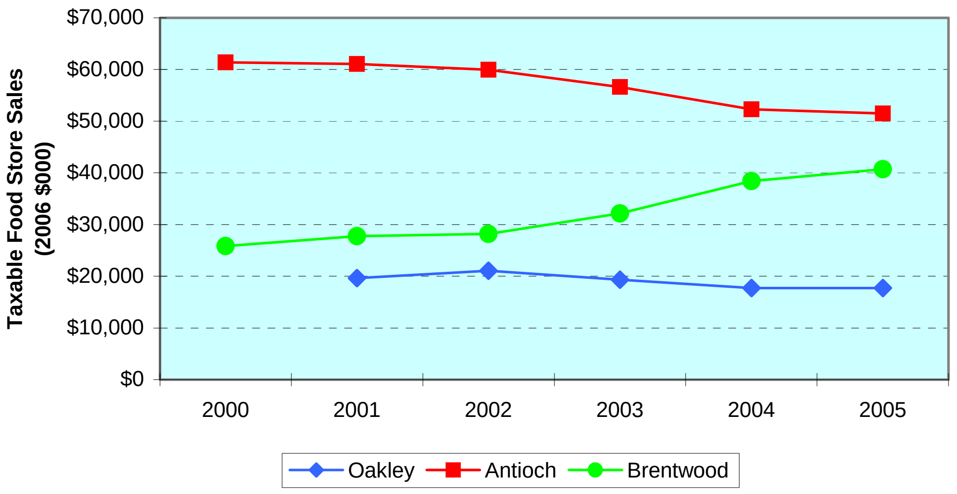
Taxable Food Store Sales

As shown in Figure 8, taxable food store sales in Oakley peaked at $21.1 million in 2002, and since then have declined slightly to $17.7 million in 2005. Antioch's food store sales have also declined, dropping nearly from $61.4 million in 2000 to $51.5 million in 2005. In contrast, Brentwood has increased its taxable food store sales every year since 2000, from $25.8 million in 2000 to $40.7 million in 2005. As mentioned earlier, this loss of sales in Antioch and Oakley, and gain in Brentwood, is most likely due to the development of WinCo in 2003. With a Safeway and the Proposed Project planned for the expanding population base in Oakley and the possible

Wal-Mart expansion in Antioch, the distribution of supermarket sales in the three cities of the Subregion may change significantly over the next several years.

On a per capita basis, Oakley in 2005 had taxable food store sales of $610, above Antioch at $511, but below Brentwood at $967. The Subregion as a whole had per capita taxable food store sales of $639, compared with $614 for Contra Costa County and $597 for California. These figures again indicate that Brentwood is capturing a relatively large share of the Subregion's sales, due in large part to the presence of WinCo.

Figure 8: Taxable Sales Trends for Food Stores in Oakley, Brentwood, and Antioch



Notes: Sales here are taxable sales only, and exclude most grocery sales as well as prescription drugs and certain other items. For details, see Appendices B-1, B-2, and B-3.

Sources: State Board of Equalization; U.S. Bureau of Labor Statistics; 2000 U.S. Census; State Department of Finance; State Division of Labor Statistics and Research; Bay Area Economics, 2007.

Taxable vs. Non-Taxable Sales in Food Stores

One difficulty in quantifying food store sales in California is that the annual data are only available for taxable items, and food items are for the most part non-taxable. To analyze total sales and assess impacts of a new project on existing supermarkets, it is necessary to estimate the percentage of a supermarket's sales that are non-taxable. One way to do this is to compare the taxable sales data with data from the Economic Census, which covers nontaxable sales as well as taxable sales; the most current Economic Census data are from 2002. Also useful in estimating total sales are stores that self-report, sales estimates from other independent sources such as Trade Dimensions (a private vendor of retail industry data), estimates based on company-wide averages derived from Annual Reports to stockholders, documented experience in other locales, and site visits to obtain a sense of the level of shopping activity. In making estimates of supermarket sales in an area, it is best to "triangulate" based on as many sources as possible.

A comparison of taxable sales data and Economic Census data (see Table 7) indicates that in Oakley in 2002, an estimated 38 percent of food store sales were taxable, higher than proportions for the other cities, the Subregion as a whole, the County, and the state[6]. A likely explanation is that due to the lack of other options in Oakley, a higher level of general merchandise shopping is occurring in the major supermarkets; the Raley's format even has more of an emphasis on non-grocery items, providing an array of general merchandise more like a chain drugstore than other supermarkets. It is important to note that the leakage analysis is very sensitive to changes in the assumptions regarding the proportion of food store sales that are taxable.

Table 7: Comparison of Total and Taxable Food Store Sales

	Oakley	Antioch	Brentwood	Subregion	Contra Costa County	State
Total Sales, from 2002 Economic Census (a) (b)**:**						
NAICS Code	445	445	44511 (d)		445	445
Food and beverage stores	$50,828	$180,145	$78,379	$309,352	$2,030,074	$60,243,253
Taxable Sales, from State Board of Equalization (a) (c)**:**						
Food Store Taxable Sales	$19,434	$55,324	$25,988	$100,746	$584,948	$18,951,412
Percent Taxable Sales:	**38%**	**31%**	**33%**	**33%**	**29%**	**31%**

Notes:
(a) Sales in $1,000s.
(b) Sales expressed in uninflated dollars.
(c) These are the best matches available for type of store. Because they are not necessarily exact matches, and because the Economic Census and the State Board of Equalization rely on different data gathering methodologies, the percentages calculated here should be seen as general guides rather than hard and fast rules for food stores. Individual stores may vary widely due to product mix and other factors.
(d) Data for larger 445 group is suppressed according to confidentiality rules; however, these stores likely represent most of sales in the category.

Sources: 2002 Economic Census; California State Board of Equalization; Bay Area Economics, 2007.

Building Materials Store Sales

Figure 9 shows trends in sales for building materials stores in Oakley, Antioch, and Brentwood. Due to disclosure rules and the limited number of outlets, the building materials sales data for 2003 and later are unavailable for Oakley. However, data for 2001 and 2002 show that Oakley lags behind in sales relative to Antioch and Brentwood, a gap that has widened considerably with closing of the hardware store in Oakley and the opening on Lone Tree Way of the new Lowe's in Antioch and Home Depot in Brentwood. Brentwood's sales rose from $20.2 million in 2000 to $72.8 million in 2005, a 261 percent increase over the six years that largely occurred between 2003 and 2004, when the Home Depot opened. Antioch's building materials store sales have also increased over the same time period, rising 128 percent from $60.2 million in 2000 to $137.0 million in 2005. Antioch is home to four home improvement retail locations that have kept its share of building material sales strong. There are two Orchard Supply Hardware stores and two Lowe's home improvement centers. Lowe's opened on Somersville Road in 2001 and Lone Tree Way in 2005.

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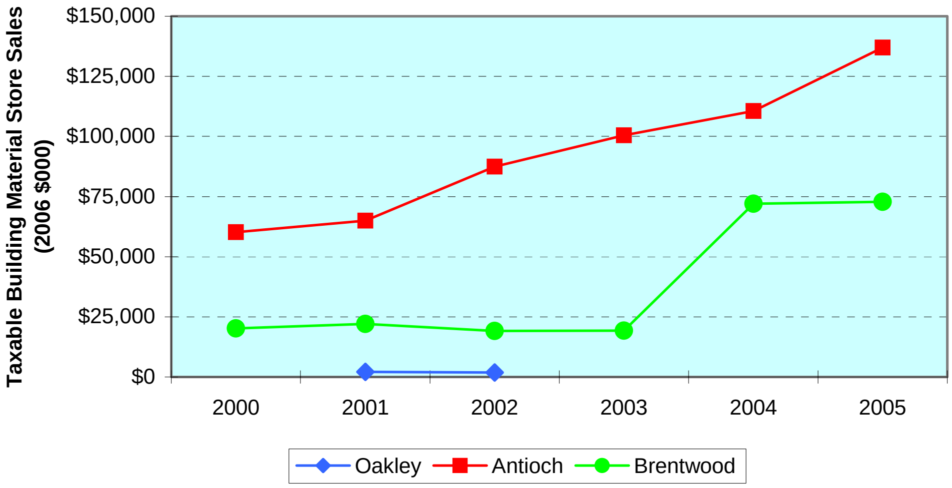
[6] This is a comparison of two data sources that rely on different collection methods, and that may not define food stores as precisely the same universe. Hence, the proportions should be seen as generally informative and not as exact proportions.

Per capita sales for this store category for Oakley are not available, but Antioch and Brentwood both show strong sales relative to the County and State, probably due in large part to capture of sales from Oakley by their major home improvement centers.

Figure 9: Taxable Sales Trends for Building Material Stores in Oakley, Antioch, and Brentwood, 2000-2005



Notes: Sales here are taxable sales only, and exclude most grocery sales as well as prescription drugs and certain other items. Building material sales for Oakley in 2003, 2004, and 2005 are unavailable due to disclosure rules. For details, see Appendices B-1, B-2, and B-3.

Sources: State Board of Equalization; U.S. Bureau of Labor Statistics; 2000 U.S. Census; State Department of Finance; State Division of Labor Statistics and Research; Bay Area Economics, 2007.

Impacts on Competing Retail Nodes

This chapter compiles an inventory of competing retail nodes and, using the information on general sales volumes by store type and the supportable square footage analysis, and estimates the impacts of the Proposed Project on sales of existing retailers in Oakley and the Subregion. The analysis covers the major uses considered for the Proposed Project as well as considering other types retail that might locate in the Proposed Project.

Inventory of Competitive Outlets

Currently, no tenants have been designated by name in the Proposed Project. Potential tenant types that have been designated include discount general merchandise superstore with grocery, a home improvement store, and other retail and restaurants. BAE has identified and inventoried major competitors for the Proposed Project in the general merchandise, supermarket, and home improvement center categories. Restaurants and gas stations have not been inventoried. Figure 10 shows the competing retail nodes and primary competitive outlets in Oakley and neighboring Antioch and Brentwood. Appendix C provides a listing of the supermarkets in the Subregion, and Appendix H provides a listing of region-serving general merchandise stores and home improvement centers.

Methodology

These competing outlets were located primarily through field surveys of the three cities in the Subregion. Square footages for the supermarkets were acquired through interviews with store managers and city planning departments, through data from the Contra Costa County Assessor via the County's online mapping information center, and from information acquired for previous BAE analysis from Supervalu, a major national supermarket holding company. In some cases Google Earth was used to verify that the numbers were of the correct order of magnitude.

Major General Merchandise Outlets

Oakley does not have any major general merchandise stores. The only significant store in this category is the Rite Aid. Beyond Oakley, Brentwood has only one major general merchandise store, a Kohl's, but has several drug stores. As previously indicated by the retail sales data, Antioch is dominant in this category, with several major stores, including an existing Wal-Mart in Williamson Ranch Plaza with a proposed expansion.[7] Antioch also has a Big Kmart near the Proposed Project site, Mervyns, Sears, Gottschalks, and Macy's in Somersville Towne Center, a Target and Mervyns in Slatten Ranch Shopping Center, and a Costco.

Major Supermarkets

Oakley has three major full-service supermarkets totaling 119,720 gross square feet, all located along Main Street. These include the 43,970 square foot Albertsons in Oakley Town Center, the 60,750 square foot Raley's in Cypress Square, and the 15,000 square foot Centro Mart in the Oakley Shopping Center. In addition, the City has approved a new 85,000 square foot

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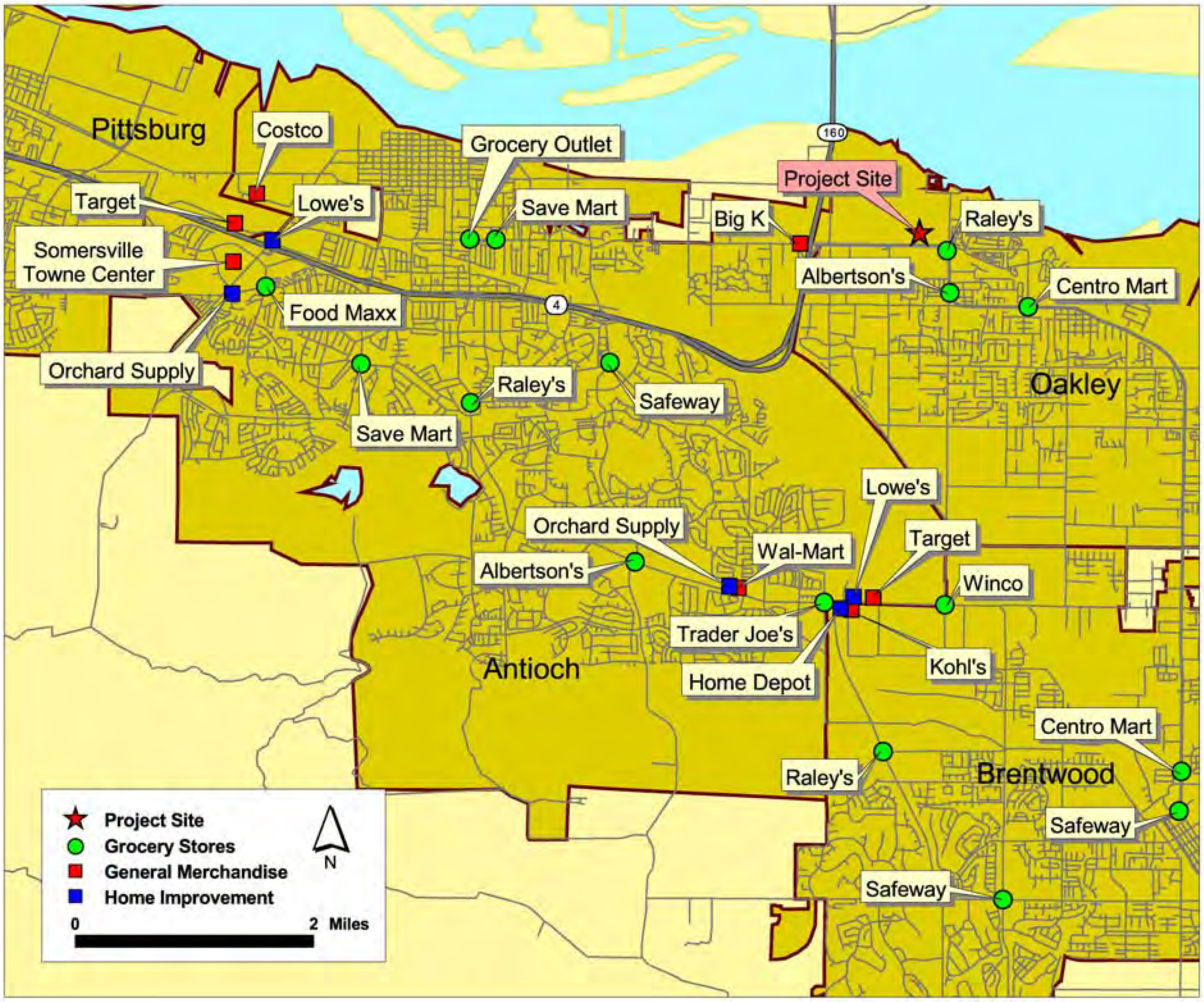
[7] Recently, the City of Antioch declined to approve this expansion. Wal-Mart's plans are not currently known, but since the possibility exists that they could come back with a revised proposal, so the potential for its development must be considered in this analysis.

development anchored by a Safeway store on the northeast corner of Laurel and O'Hara. Safeway, as a corporate strategy, is trying to develop a more upscale image as it seeks to reposition itself in the face of Wal-Mart competition on the lower end of the market; this Safeway will most likely be in this format. The Albertsons store was recently remodeled, and its center currently has no vacancies; this Albertsons is part of the recent acquisition of all northern California Albertsons by Save-Mart, a California supermarket chain based in Modesto. These stores were all moderately busy at the time of BAE's site visit.

Figure 10: Major Competitive Retail Outlets



Both Antioch and Brentwood have a number and variety of supermarkets, including Albertsons, Centro-Mart, Raley's, Safeway, WinCo, and Save-Mart; this likely precludes much food shopping by their residents in Oakley. There are an estimated 322,536 square feet of supermarket space in Antioch and 307,171 square feet in Brentwood, bringing the total for the Subregion to approximately 750,000 square feet. Additionally, Antioch has a Costco, which carries food items, typically in bulk or large sizes, and caters in part to pantry-loading households.

Home Improvement Centers

Oakley does not have any home improvement centers; the only business in the building materials category in the City was the recently closed True Value Hardware store. In terms of major competitors, Brentwood has the Home Depot and Antioch has two Lowe's and two Orchard Supply Hardware stores.

Leakage Analysis and Demand for New Retail Space in Oakley and the Subregion

Overview of Methodology

Retail leakage analysis compares actual retail sales in an area with some benchmark that provides a measure of the potential sales generated by that area's residents. If sales levels are below the predicted level, the area may be able to support increased sales. This increase in sales could take the form of increased sales in existing outlets or in new outlets.

A lower-than-predicted sales volume implies that consumers are traveling outside the area to shop; thus, the sales are "leaking" out of the study area. However, if the area shows more sales than would be expected from the area's characteristics, there are sales "injections" into the study area. Often, an injection of sales indicates that the study area is serving as the regional shopping destination for a broader area. Conversely, if an area shows substantial leakage, it may be due to the presence of a region-serving retail node outside the study area capturing those "leaked" sales. In such a case, the study area itself may not have sufficient population to support the region-serving retail, so those sales cannot expect to be captured within the study area.

There are a number of factors that can be used to predict sales levels, with the two most important factors being the number of persons in the area and the disposable income available to that population. Additional factors influencing retail spending in an area include household type, age of population, number of workers in the area (i.e., daytime population), tenure patterns (owner vs. renter), and cultural factors.

To develop a benchmark, BAE has assumed that the Subregion functions as a relatively self-contained regional retail market, since most types of retail can be found within the Subregion and the relative isolation from most other retail centers makes it likely that most residents expend most of their retail dollars within the Subregion. Additionally, most of the area is suburban in nature, and the three cities have similar income levels, tenure rates, and household sizes and types. While the County, with its higher per capita sales levels, could also be considered as the benchmark, this would not take into account the lower household incomes found in the Subregion. Thus, the Subregion is used as a benchmark for potential sales for Oakley, and the Subregion is assumed to be "in balance" for its current retail sales.

Trade Area Sales Potential

Using the most recent published taxable sales data as a baseline, BAE has estimated the leakage of retail sales from Oakley in that baseline year. This baseline year is used throughout the following analysis, except as noted. The results of this analysis are shown in Table 8. For 2005, Oakley shows extensive leakage in all major categories of retail outlets with the exception of service stations. Total net retail sales leakages from Oakley are estimated at approximately $151 million annually, out of a total sales potential of $283 million. These leakages confirm that Oakley consumers are almost certainly doing a great deal of their shopping outside the City.

For the key category of general merchandise stores, leakage is estimated at $40.7 million annually, 76 percent of total sales potential in this store category. Even for the more locally-oriented category of food stores where the proportion of sales leakage is only 19 percent of total sales, leakage is estimated at approximately $10.9 million annually. Eating and drinking places show leakage of 44 percent of potential or $11.4 million annually. Building materials shows 100 percent leakage at $36.4 million.

Among other categories, apparel stores show leakage of nearly all sales, or $10.1 million annually out of $10.2 million in potential sales, due to limited sales in existing outlets; as shown in Table 6 above, Oakley had only $95,000 in taxable apparel sales in 2005, or $3 per capita. Home furnishings and appliance stores show leakage of $4.7 million annually, or 54 percent of potential sales. While the auto dealers and supplies category shows leakage of sales, most outlets in this category are unsuitable for the Proposed Project and thus no capture will be assumed. Service stations show limited injections of sales. The other retail outlets category, which covers other retail store types not in the above major categories, shows $8.1 million in leakage of $26.5 million in total potential sales.

In summary, baseline conditions indicate extremely high leakages of sales in Oakley, a strong indicator that additional retail development could be supported in the City.

Table 8: Leakage Analysis for Oakley

	2005 Per Capita Taxable Retail Sales 2006 $ (a)		Estimated 2005 Taxable Retail Sales 2006 $000 (b)		Estimated 2005 Total Retail Sales 2006 $000 (c)		Estimated 2005 Per Capita Retail Sales 2006 $	
Store Category	**Oakley**	**Subregion**	**Oakley**	**Subregion**	**Oakley**	**Subregion**	**Oakley**	**Subregion**
Apparel Stores	$3	$341	$97	$59,542	$97	$59,542	$3	$341
General Merchandise Stores	na	$1,616	na	$281,976	$12,779	$313,306	$429	$1,795
Food Stores	$610	$639	$18,183	$111,564	$47,555	$342,571	$1,596	$1,963
Eating and Drinking Places	$491	$873	$14,647	$152,382	$14,647	$152,382	$491	$873
Home Furnishings and Appliances	$135	$294	$4,011	$51,218	$4,011	$51,218	$135	$294
Building Materials and Farm Implements	$0	$1,220	$0	$212,938	$0	$212,938	$0	$1,220
Auto Dealers and Auto Supplies	$245	$1,210	$7,309	$211,069	$7,309	$211,069	$245	$1,210
Service Stations	$927	$926	$27,626	$161,671	$27,626	$161,671	$927	$926
Other Retail Stores	$616	$889	$18,362	$155,118	$18,362	$155,118	$616	$889

Store Category	Potential Total Sales 2006 $000	Per Capita Injection/ (Leakage) 2006 $	Total Injection/ (Leakage) 2006 $000
Apparel Stores	$10,168	($338)	($10,100)
General Merchandise Stores	$53,504	($1,367)	($40,700)
Food Stores	$58,502	($367)	($10,900)
Eating and Drinking Places	$26,023	($382)	($11,400)
Home Furnishings and Appliances	$8,747	($159)	($4,700)
Building Materials and Farm Implements	$36,364	($1,220)	($36,400)
Auto Dealers and Auto Supplies	$36,045	($964)	($28,700)
Service Stations	$27,609	$1	$0
Other Retail Stores	$26,490	($273)	($8,100)
Total/Average	$283,453	($5,069)	($151,000)

For notes and sources for this table, refer to Appendix D.

Potential Capture of Leakage at Proposed Project

Table 9 shows total potential supportable square footage of new retail supportable by Oakley's population using 2005 as a baseline. This estimate of supportable square feet is derived based on sales performance at industry norms. It is anticipated that the proposed project (or other retail development in the City) could capture sales from existing Oakley residents to support an additional 239,000 square feet of retail space. Note that the capture varies by category, and never reaches 100 percent, since it assumed that shoppers will still seek variety in their shopping options. For instance, some general merchandise sales will still go to mall-type stores as well as Target and other stores in the Subregion but outside Oakley. The capture of food store-equivalent sales is assumed at a higher rate because of the convenience-oriented nature of food shopping, but some shoppers will still shop in other stores outside Oakley but in the Subregion that offer a different shopping experience, such as WinCo and Trader Joe's. This total square footage includes 24,000 square feet of apparel store space, 65,000 square feet of general merchandise store space, 23,000 square feet of food store space, 19,000 square feet of restaurant space, 7,000 square feet of home furnishings/appliance store space, 86,000 square feet of building materials store space, and 15,000 square feet for other retail outlets.

Table 9: Supportable Space in Oakley from Leakage, 2005

Store Category	Total Injection/ (Leakage) 2006 $000	Capture Rate	Additional Sales 2006 $000	Annual Sales per SF 2006 $	Additional Supportable SF
Apparel Stores	($10,100)	60%	$6,060	$256	24,000
General Merchandise Stores	($40,700)	67%	$27,269	$418	65,000
Food Stores	($10,900)	90%	$9,810	$418	23,000
Eating and Drinking Places	($11,400)	90%	$10,260	$528	19,000
Home Furnishings and Appliances	($4,700)	60%	$2,820	$383	7,000
Building Materials and Farm Implements	($36,400)	80%	$29,120	$337	86,000
Auto Dealers and Auto Supplies	($28,700)		$0		
Service Stations	$0		$0		
Other Retail Stores	($8,100)	50%	$4,050	$275	15,000
Total/Average	($151,000)	59%	$89,389		239,000

For notes and sources for this table, refer to Appendix D.

Future conditions are given for two points in time, 2010 and 2015. While the project is assumed to open in 2009, it is reasonable to use a point a year beyond that (for which more reliable demographic data are available in any case) since any impacts occurring solely prior to that time should be short-term, and would not lead to the cycle of urban decay dependent upon long-term vacancies. These short-term impacts are considered, however, especially with respect to Oakley's supermarkets.

Oakley's expected rapid population growth will increase retail sales and support additional square footage in the City, amounting to an additional 300,000 square feet by 2010 (see Table 10). Overall, capture of existing sales leakages and from sales increases due to population growth indicate a potential supportable square footage of approximately 539,000 square feet at the proposed project in 2010, approximately two years after the assumed opening date.

Between 2010 and 2015, the supportable square footage is projected to grow an additional 95,000 square feet, for a total potential square footage supported by leakage and increases in sales potential of 634,000 square feet. This includes 46,000 square feet of apparel store space, 144,000 square feet of general merchandise store space, 139,000 square feet of food store space, 60,000 square feet of eating and drinking places, 20,000 square feet of home furnishings/appliance store space, 165,000 square feet of building materials store space, and 60,000 square feet of space for other retail outlets. For food stores and building materials stores, this nearly equals or exceeds the space assumed for the use within the project. This may indicate that as the project develops, the tenant mix might shift according to demand or that certain types of stores will exceed the sales performance assumed here, or that additional space will be built to satisfy demand. For instance, some of the excess food store square footage could be absorbed by a specialty foods store, or by higher sales levels within the supercenter. The project is also likely to attract Subregion shoppers who live outside Oakley; this is discussed in more detail below.

Table 10: Additional Supportable Retail from Population Growth, 2005-2010

2005-2010

Store Category	Potential Per Capita Sales 2006 $	Total Additional Sales 2006 $000	Capture Rate	Captured Additional Sales 2006 $000	Average Sales per Square Foot 2006 $	Additional Supportable SF	Total Supportable SF
Apparel Stores	$341	$7,100	60%	$4,260	$256	17,000	41,000
General Merchandise Stores	$1,795	$37,300	67%	$24,991	$418	60,000	125,000
Food Stores	$1,963	$40,800	90%	$36,720	$418	88,000	111,000
Eating and Drinking Places	$873	$18,200	90%	$16,380	$528	31,000	50,000
Home Furnishings and Appliances	$294	$6,100	60%	$3,660	$383	10,000	17,000
Building Materials and Farm Implements	$1,220	$25,400	80%	$20,320	$337	60,000	146,000
Auto Dealers and Auto Supplies	$1,210	$25,200					
Service Stations	$926	$19,300					
Other Retail	$889	$18,500	50%	$9,250	$275	34,000	49,000
		$197,900		**$115,581**		**300,000**	**539,000**

2010-2015

Store Category	Potential Per Capita Sales 2006 $	Total Additional Sales 2006 $000	Capture Rate	Captured Additional Sales 2006 $000	Average Sales per Square Foot 2006 $	Additional Supportable SF	Total Supportable SF
Apparel Stores	$341	$2,300	60%	$1,380	$256	5,000	46,000
General Merchandise Stores	$1,795	$12,000	67%	$8,040	$418	19,000	144,000
Food Stores	$1,963	$13,200	90%	$11,880	$418	28,000	139,000
Eating and Drinking Places	$873	$5,900	90%	$5,310	$528	10,000	60,000
Home Furnishings and Appliances	$294	$2,000	60%	$1,200	$383	3,000	20,000
Building Materials and Farm Implements	$1,220	$8,200	80%	$6,560	$337	19,000	165,000
Auto Dealers and Auto Supplies	$1,210	$8,100					
Service Stations	$926	$6,200					
Other Retail	$889	$6,000	50%	$3,000	$275	11,000	60,000
		$63,900		**$37,370**		**95,000**	**634,000**

Notes:
All sales in 2006 dollars.
See Table 2 for population data.

Oakley population growth, 2005-2010	20,800
Oakley population growth, 2010-2015	6,700

Potential per capita sales and capture rates from Tables 8 and 9.

Sources: Bay Area Economics 2007, based on information from the CA State Board of Equalization, 2000 U.S. Census, 2002 Census of Retail Trade, Association of Bay Area Governments, City of Oakley, Urban Land Institute, Wal-Mart, Home Depot, Lowe's, Rite-Aid, and Kohl's Annual Reports, and Hinderliter de Lamas (HdL).

Capture of Additional Sales from Subregion

Just as residents of Oakley are not likely to do all their shopping with the City but continue to frequent other types of stores outside the City that offer a different shopping experience, other residents from elsewhere in the Subregion are likely to redirect some of their shopping to this center. For example, if the Wal-Mart in Antioch is not expanded to a Supercenter format, those shoppers who wish to do the "one-stop" shopping offered by a superstore may venture to Oakley. However, unlike Oakley where shopping opportunities are very limited, for some types of stores the residents elsewhere in the Subregion have a variety of shopping options, so the level of capture of these expenditures in Oakley is conservatively assumed to be very low (see Table 11).

Table 11: Capture from Remainder of Subregion, 2005-2010

Baseline Population 2005

Store Category	Potential Per Capita Sales 2006 $	Total Sales Potential 2006 $000	Capture Rate	Captured Additional Sales 2006 $000	Average Sales per Square Foot 2006 $	Additional Supportable SF	Subregion Total Supportable SF	Oakley+Subregion Total Supportable SF
Apparel Stores	$341	$49,374	10%	$4,937	$256	19,000	19,000	43,000
General Merchandise Stores	$1,795	$259,802	10%	$25,980	$418	62,000	62,000	127,000
Food Stores	$1,963	$284,069	10%	$28,407	$418	68,000	68,000	91,000
Eating and Drinking Places	$873	$126,359	10%	$12,636	$528	24,000	24,000	43,000
Home Furnishings and Appliances	$294	$42,471	10%	$4,247	$383	11,000	11,000	18,000
Building Materials and Farm Implements	$1,220	$176,574	5%	$8,829	$337	26,000	26,000	112,000
Auto Dealers and Auto Supplies	$1,210	$175,024		$0			-	
Service Stations	$926	$134,062		$0			-	
Other Retail	$889	$128,628	10%	$12,863	$275	47,000	47,000	62,000
						257,000	**257,000**	**496,000**

Additional Capture from Subregion Growth, 2005-2010

Store Category	Potential Per Capita Sales 2006 $	Total Additional Sales 2006 $000	Capture Rate	Captured Additional Sales 2006 $000	Average Sales per Square Foot 2006 $	Additional Supportable SF	Subregion Total Supportable SF	Oakley+Subregion Total Supportable SF
Apparel Stores	$341	$4,300	10%	$430	$256	2,000	21,000	62,000
General Merchandise Stores	$1,795	$22,600	10%	$2,260	$418	5,000	67,000	192,000
Food Stores	$1,963	$24,700	10%	$2,470	$418	6,000	74,000	185,000
Eating and Drinking Places	$873	$11,000	10%	$1,100	$528	2,000	26,000	76,000
Home Furnishings and Appliances	$294	$3,700	10%	$370	$383	1,000	12,000	29,000
Building Materials and Farm Implements	$1,220	$15,400	5%	$770	$337	2,000	28,000	174,000
Auto Dealers and Auto Supplies	$1,210	$15,200					-	
Service Stations	$926	$11,700					-	
Other Retail	$889	$11,200	10%	$1,120	$275	4,000	51,000	100,000
						22,000	**279,000**	**818,000**

Additional Capture from Subregion Growth, 2010-2015

Store Category	Potential Per Capita Sales 2006 $	2010-2015 Additional Sales 2006 $000	Capture Rate	Captured Additional Sales 2006 $000	Average Sales per Square Foot 2006 $	Additional Supportable SF	Subregion Total Supportable SF	Oakley+Subregion Total Supportable SF
Apparel Stores	$341	$4,300	10%	$430	$256	2,000	23,000	69,000
General Merchandise Stores	$1,795	$22,800	10%	$2,280	$418	5,000	72,000	216,000
Food Stores	$1,963	$24,900	10%	$2,490	$418	6,000	80,000	219,000
Eating and Drinking Places	$873	$11,100	10%	$1,110	$528	2,000	28,000	88,000
Home Furnishings and Appliances	$294	$3,700	10%	$370	$383	1,000	13,000	33,000
Building Materials and Farm Implements	$1,220	$15,500	5%	$775	$337	2,000	30,000	195,000
Auto Dealers and Auto Supplies	$1,210	$15,400						
Service Stations	$926	$11,800						
Other Retail	$889	$11,300	10%	$1,130	$275	4,000	55,000	115,000
						22,000	**301,000**	**935,000**

See Table 2 for population data.

Subregion (less Oakley) baseline population,2005	144,700
Subregion (less Oakley) population growth, 2005-2010	12,600
Subregion (less Oakley) population growth, 2010-2015	12,700

Potential per capita sales from Tables 8 and 9. Capture rates are assumed much lower than from Oakley population due to wide range of other shopping options within the Subregion.

Sources: Bay Area Economics 2007, based on information from the CA State Board of Equalization, 2000 U.S. Census, 2002 Census of Retail Trade, Association of Bay Area Governments, City of Oakley, Urban Land Institute, Wal-Mart, Home Depot, Lowe's, Rite-Aid, and Kohl's Annual Reports, and Hinderliter de Lamas (HdL).

Impacts of Proposed Projects on Existing Retail Nodes and Outlets

This section assesses the impacts of the Proposed Project on sales at existing retail outlets in Oakley. Impacts assessed include those on general merchandise stores, supermarkets, home improvement centers, restaurants, and non-automotive retail of all other types. Next, this section assesses how this proposed project might affect the other major retail nodes in Oakley and the Subregion. The analysis focuses on major retailer types, since these are the types of stores that anchor shopping centers and districts. While smaller stores may close and create vacancies, it is the long-term loss of large anchor tenants that can contribute primarily to loss of center revenues. The actual potential for physical deterioration and urban decay, however, is also influenced by other factors such as the duration of vacancy and availability of programs and funding to maintain buildings and encourage reuse of facilities. Finally, the chapter considers cumulative impacts relating to other planned and proposed retail development in Oakley and surrounding communities. The potential for physical impacts are separately considered on the basis of this documentation as part of the Draft EIR analysis.

The analysis that follows begins by assuming that this will be a fully functioning center, with outlets performing at industry norms for sales. This estimate of sales is presented in Table 12.[8] Total project sales at full occupancy and benchmark sales levels are estimated at approximately $272 million dollars annually.

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[8] Actual sales in the project may vary from this depending on the actual retail mix. Additionally, the project is likely to include some non-retail uses (e.g., bank) that do not generate retail sales. The estimate here assumes only retail as a "worst case" scenario with respect to impacts.

Table 12: Estimated Annual Sales in Project at Full Occupancy

Type of Store	**Square Feet** (a)	**Sales per SF** (b)	**Estimated Sales in Proposed Project** (c)
General Merchandise Stores	165,000	$418	$68,970,000
Food Stores (d)	65,000	$418	$27,170,000
Eating and Drinking Places	88,000	$528	$46,464,000
Building Materials and Farm Implements	170,000	$337	$57,290,000
Mixed Retail (e)	252,000	$287	$72,355,000
Total	**740,000**		**$272,249,000**

All sales estimates in 2006 dollars.
(a) Derived from Table 1 per latest site plan available, in combination with the supportable square footage analysis in Table 11.
(b) Sales per square foot from Table 8. For mixed retail, number is a weighted average derived from combining apparel, home furnishings/ appliances with other retail.
(c) Rounded to nearest thousand.
(d) The supermarket space equivalent inside a supercenter type store.
(e) Combines the Home Furnishings and Appliances Stores and Other Retail Stores categories.

Assumes all space is occupied by retailers. This is the "worst case" scenario as far as impacts on other retail stores.

Sources: Bay Area Economics 2007, based on information from the CA State Board of Equalization, 2000 U.S. Census, 2002 Census of Retail Trade, Association of Bay Area Governments, City of Oakley, Urban Land Institute, Wal-Mart, Home Depot, Lowe's, Rite-Aid, and Kohl's Annual Reports, and Hinderliter de Lamas (HdL).

Table 13 presents a comparison of the supportable square footage generated by capture of retail sales leakage and population growth in Oakley's leakage as well as from capture of sales from elsewhere in the Subregion. This comparison shows that under baseline conditions, sales from leakage and regional capture would not support the project, a strong indicator that sales would be captured from existing stores beyond what is assumed here, or that the project might not perform at industry benchmarks with the baseline population. By 2010, however, Oakley alone could support the supermarket space, and with the limited capture from the remainder of the Subregion could support all components except the restaurants and the mixed retail. By 2015, Oakley alone could support most of the retail space in the Proposed Project, and with limited capture from the remainder of the Subregion, the entire project is supportable.[9] This is consistent with the assumption that the project would build out over a number of years, as Oakley's population grows to a level where these components could be supported.

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[9] While the total support for miscellaneous retail is slightly below the project size, this difference is minor and the project could easily fill this space through non-retail businesses or through specialty general merchandise, building materials, or food stores within the project.

Table 13: Comparison of Supportable Square Footage and Proposed Project

Baseline (2005)

Store Category	Supportable Square Footage Oakley Leakage	Supportable Square Footage Oakley + Subregion	Proposed Project
General Merchandise Stores	65,000	127,000	165,000
Food Stores	23,000	91,000	65,000
Eating and Drinking Places	19,000	43,000	88,000
Building Materials and Farm Implements	86,000	112,000	170,000
Mixed Retail	46,000	123,000	252,000
	239,000	**496,000**	**740,000**

2010

Store Category	Supportable SF Oakley Leakage + Growth	Supportable Square Footage Oakley + Subregion	Proposed Project
General Merchandise Stores	125,000	192,000	165,000
Food Stores	111,000	185,000	65,000
Eating and Drinking Places	50,000	76,000	88,000
Building Materials and Farm Implements	146,000	174,000	170,000
Mixed Retail	107,000	191,000	252,000
	539,000	**818,000**	**740,000**

2015

Store Category	Supportable SF Oakley Leakage + Growth	Supportable Square Footage Oakley + Subregion	Proposed Project
General Merchandise Stores	144,000	216,000	165,000
Food Stores	139,000	219,000	65,000
Eating and Drinking Places	60,000	88,000	88,000
Building Materials and Farm Implements	165,000	195,000	170,000
Mixed Retail	126,000	217,000	252,000
	634,000	**935,000**	**740,000**

Sources: Bay Area Economics 2007, based on information from the CA State Board of Equalization, 2000 U.S. Census, 2002 Census of Retail Trade, Association of Bay Area Governments, City of Oakley, Urban Land Institute, Wal-Mart, Home Depot, Lowe's, Rite-Aid, and Kohl's Annual Reports, and Hinderliter de Lamas (HdL).

Estimated Impacts of Proposed Project on Existing General Merchandise Outlets

The analysis summarized in Table 11 above indicates that there is demand to support an additional 192,000 square feet of general merchandise store space in Oakley in 2010, and 216,000 square feet in 2015. The new 230,000 square foot general merchandise store in the Proposed Project represents an addition of 165,000 square feet of general merchandise store space (with the balance representing an additional 65,000 square feet of supermarket-equivalent use), less than the total supportable square footage as shown in Table 11.

However, at least some of this support would come at the expense of existing stores (particularly in the earlier years of operation), especially in the Subregion outside Oakley, as Antioch and

Brentwood shoppers are attracted to the supercenter. Within Oakley, the only competitor in this general category is the Rite-Aid, which while in a more convenience-oriented market niche, could also see some short term sales loss despite the overall leakage. As shown in Table 11, nearly $26 million in annual sales would be captured from existing outlets' 2005 sales levels from Brentwood and Antioch. This is roughly equivalent to the sales of a large discount general merchandise store such as Kmart or Target. While this capture would be spread among the competitors, the greatest impacts would fall on the closest stores, especially the Antioch Kmart, which is already a relatively weak competitor (nationally, Kmart average sales per square foot are less than half of Wal-Mart's).[10] Based on its smaller relative sales volume and closer proximity to the Proposed Project, the Kmart would be at higher relative risk of closure.[11] The remainder of the Proposed Project's estimated sales capture would be divided among several other major competitors at a greater distance (e.g., Target, Sears); consequently the effect on individual stores and risk of closure would be reduced.

Over the long term, regional sales would grow to where a store the size of Kmart could be supported, but much of that growth will be at the developing periphery of the Subregion rather than near the Kmart, so other stores may be more likely to capture that growth; furthermore, another possibility is that the supercenter at the Proposed Project would have sales above national averages. Thus even in the long term, the Kmart is at risk of closure.

Estimated Impacts on Existing Supermarkets

As shown in Table 9 above, based on the leakage analysis, Oakley cannot support another full-size supermarket under baseline conditions. This changes if the City grows rapidly as projected over the next several years, with support for an additional 111,000 square feet of food store space in 2010 and 139,000 square feet by 2015. Based on this market growth, it is likely that there is adequate demand for both the existing supermarket space and space dedicated to supermarket-related items in the Proposed Project.

However, the supermarket impacts are of particular concern with a supercenter, and especially in Oakley where they represent the largest existing retail outlets, anchoring three shopping centers near the Cline Property. Rather than relying on leakage and capture analysis alone in analyzing supermarket sales trends, the following analysis also evaluates the actual performance of the stores by estimating sales per square feet, comparing that to industry benchmarks, and looking at likely outcomes as supermarket space is added to the Subregion.

Based on taxable sales data, Economic Census data, and confidential sales data from proprietary sources, BAE estimates 2005 baseline supermarket sales in the three major supermarkets in Oakley (Albertsons, Raley's, and Centro Mart) at approximately $40 million (see Table 14). Store sales are estimated at an average of $334 annually per square foot for these existing supermarkets. This overall average is below a median industry benchmark of $392 from *Dollars & Cents of Shopping Centers/The Score 2006* published by the Urban Land Institute (ULI) and the International Council of Shopping Centers (ICSC).

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[10] See Annual Reports for Sears Holding Company and Wal-Mart.

[11] For a more complete discussion, see section below on impact by retail node.

Table 14: Estimated 2005 Sales at Existing Supermarkets in Oakley

Estimated Supermarket Sales (b) (c)	$40,000,000
Existing Supermarket Square Feet	119,720
Estimated Average Annual Sales per Square Foot	$334
ULI Median, All Supermarkets (d)	$392

(a) 2006 population derived from Table 2, using a constant growth rate from 2005-2010.
(b) Based on estimates by BAE based on confidential sources, published taxable sales data, Census of Retail Trade, site visits and industry benchmarks.
(c) Sales estimates in 2006 dollars.
(d) Urban Land Institute/International Council of Shopping Center, *Dollars & Cents of Shopping Centers/The Score 2006* . Median for all supermarkets in community and supercommunity shopping centers nationwide.

Source: Bay Area Economics 2007, based on information from City of Oakley, State Board of Equalization, 2002 Census of Retail Trade, Trade Dimensions, and ULI/ICSC.

Site visits and confidential data indicate that the strongest performer of these three stores is the Albertsons (it is noteworthy that this store was not part of the series of Albertsons closures last year, unlike the stores in Pittsburg and Brentwood), followed by Raley's, with the Centro Mart showing the poorest performance. Both Raley's and the Centro Mart may have sales per square foot well below the ULI median.[12]

Thus, even though Oakley appears to have leakage in the food store category, some of the existing supermarkets are underperforming. This is probably due to the strong competition from stores in neighboring communities, especially the WinCo in Brentwood; both Antioch and Oakley show declines in food store sales following the opening of that store, which is well-situated to capture sales from all three cities. A discount supercenter with a full line of groceries would present a more direct competitor to WinCo and thus be capable of recapturing some of these lost sales. However, the supercenter is also likely to capture sales from the existing stores, and the weaker competitors may be at risk of closure.

Table 15 provides specific analysis of food store impacts as focused on supermarkets. In addition to the current sales, the leakage analysis estimates that there are an additional $9.8 million potentially capturable from leakage, indicating a per capita sales potential of $1,671 annually in supermarket sales.[13] This per capita sales number is used to assess potential future supermarket sales in Oakley on the assumption that the leakage as noted can be captured by the supercenter. By 2010, only two years subsequent to the assumed opening date, average annual sales per square foot at the Oakley's existing supermarkets would increase by an estimated 37 percent from 2005 levels of $334 per square foot, to an estimated $ $458. Thus, while in the short term Raley's and

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[12] It is important to note that industry benchmarks are not an indicator of the level of profitability of individual stores; some stores might be profitable at a lower sales level, while others may require greater market support. Retail operators have varying standards regarding satisfactory store performance and profit margins.

[13] This excludes food store sales outside supermarkets (e.g., convenience stores, specialty food stores) and is smaller than the total food store potential sales as shown in Table 8.

Centro Mart could be at risk of closure with sup-par performance and the entry of a major new competitor, long term there appears to be ample demand in Oakley to support either those stores, or replacement stores that are repositioned to target a market niche differentiated from the supercenter (e.g., ethnic orientation or upscale foods).

Table 15: Potential Impact on Existing Oakley Supermarkets, 2005 - 2010

	2005	2010
Oakley Population (a)	29,800	50,600
Current Supermarket Sales	$40,000,000	
Capture from Leakage (c)	$9,810,000	
Supermarket Sales Potential (a) (b)	$49,810,000	$84,580,000
Potential Sales per Capita	$1,671	$1,671
Existing Supermarket Square Feet	119,720	119,720
Additional Grocery Store in Project (d)		65,000
Sales per Square Foot in Grocery Space in Proposed Project (e)		$458
Estimated Supermarket Sales in New Store (b)		$29,760,000
Sales in Existing Outlets (b)	$40,000,000	$54,820,000
Average Annual Sales per Square Foot at Existing Stores	**$334**	**$458**
Percent Change from 2005		**37%**

(a) From Table 2.
(b) All estimates throughout table in 2006 dollars. All total sales estimates rounded to nearest ten thousand.
(c) From Table 9.
(d) Assumed based on typical supercenter format. Actual size of supermarket-equivalent space may vary.
(e) Sales per square foot based on average sales per square foot per Wal-Mart, or estimated average sales per square foot in combined new store and existing stores, whichever is higher.

Source: Bay Area Economics 2007, based on information from City of Oakley, State Board of Equalization, 2002 Census of Retail Trade, and Trade Dimensions.

While the greatest supermarket sales impacts from the Proposed Projects will occur in Oakley, other supermarkets in the Subregion may also be impacted as shoppers are attracted by the supercenter format (and possibly by lower prices). These impacts will be greatest on the stores closest in location and in market niche to the supercenter’s supermarket-equivalent space. The supermarket store outside Oakley that is the closest both in distance and in market niche is the WinCo in Brentwood. This store is reported by WinCo representatives to be achieving sales of over $50 million annually, or over $500 per square foot. The overall capture from outside Oakley is estimated at 10 percent; even if this store lost 20 percent of its sales it would still be performing above the ULI benchmark and would not be likely to close. The remainder of the sales capture will be spread among the other 12 supermarkets in the Subregion (see Appendix E for an inventory), so it would speculative to assert that any specific store would be at risk of closure. By

2010, population growth in Brentwood and Antioch should provide sufficient support to allow sales to recover to near current sales levels (see Table 11 above).

Estimated Impacts on Building Materials Stores

The City of Oakley currently has no building materials stores. It is assumed the Oakley resident's patronize home improvement centers and related stores elsewhere in the Subregion.

The leakage analysis indicates baseline support for an additional 86,000 square feet in this category, growing to 146,000 square feet by 2010 and to 165,000 square feet by 2015 (see Tables 9 and 10 above). This means that in the short term, opening of the 170,000 square-foot home improvement center in the Proposed Project in 2009 could result in sales being cannibalized from existing outlets in the Subregion.[14] However, given the broad coverage of the Subregion already by similar stores (two Lowe's stores, one Home Depot, and two Orchard Supply Hardware stores), the project's ability to capture from existing stores may be limited, and as a result this store may underperform industry norms. Nevertheless, it would still capture sales from these existing outlets, but between 2010 and 2015 growth in the Subregion should allow the competitive stores to recover to current sales levels even with the Proposed Project in place. Whether any of the existing stores would close due to short term losses depends on the long-term goals for market share and profitability for the two major competitors in this field, Lowe's and Home Depot, which are currently competing for market share as they both add stores. The two Orchard Supply stores occupy a slightly different niche, with smaller stores and a more convenience orientation, and thus are less likely to be impacted (in other words, those who choose to shop at Orchard already bypass Lowe's and Home Depot, and are likely to continue to do so.

Estimated Impacts for Eating and Drinking Places

Oakley shows support for an estimated additional 50,000 square feet of restaurant space by 2010 and 60,000 square feet by 2015 (see Table 10 above). Additionally, non-Oakley shoppers attracted to the center by the major anchors should provide additional sales support, with total estimated support for 88,000 square feet of restaurant space by 2015 (see Table 11 above). This demand should help absorb vacancies in the center as it builds out the smaller spaces surrounding the anchor tenants. Since this space can be added incrementally as demand increases, there is less likelihood that it will impact current restaurants in Oakley and the Subregion. However, some restaurants may face closure as a result of lost business due to the competition from new restaurants at the proposed project. These scattered outlets are not anchors of large retail centers, and even if they are vacated, the vacancy is not likely to lead to a cycle of urban decay and physical impacts as might occur with the loss of a major anchor tenant. .

Impacts on Other Retail Sectors and Overall Impact in Oakley

Table 13 above presents an overview of the potential demand for retail space in Oakley as compared to the Proposed Project assuming its outlets perform at industry standards. As can be seen, demand for retail in these other store categories (apparel, home furnishings/appliances, and other retail outlets) will not reach the size of the assumed space in the project even in 2015. This

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[14] According to the information provided to BAE, no particular retailer has committed to the spaced planned for a home improvement center.

indicates that the Proposed Project, if built out fully as retail any time up to at least 2015, will capture sales from existing outlets. In fact, the sales capture necessary is greater than the total sales for these store types currently occurring in Oakley. As a result, sales would have to be captured from beyond Oakley to support the project, or the project might not perform at industry benchmark levels, buildout would be phased to match demand, or some of the project's space would not be in retail space (e.g., bank). A likely outcome is a mix of the above; buildout might precede the demand somewhat but not enough to avoid impacts on existing businesses; capture from Oakley could take the form of stores relocating to the new center, or closures of the existing stores in the face of new competition, additional sales might be captured from non-Oakley shoppers who are attracted to the center by the large anchor stores, and the stores in the Proposed Project might perform at lower sales levels until the market support grows to a level to support the stores.

Given the unknowns regarding much of the retail mix at the Proposed Project, and considering also the uncertainty of market dynamics in a potentially oversaturated market, it is not possible to identify any specific additional retail stores which may face closure due to the project, and any effort to do so would be speculative. Furthermore, because of the limited retail outlets in Oakley now, the impacts would be limited to smaller retail stores. These stores are not anchors of large retail centers, and even if they are vacated, the vacancy is not likely to lead to a cycle of urban decay and physical impacts as might occur with the loss of a major anchor tenant. In any retail market, existing retail space is regularly vacated due to functional obsolescence or the general cycle of retail closures and openings over time. Retail markets always have a certain amount of vacant space due to normal turnover and changes in retailing, and this vacancy does not necessarily lead to urban decay or other physical impacts.

Impacts by Retail Node in Oakley

Oakley has three major shopping centers, all located along Main Street. These include the 109,000 square foot Oakley Town Center anchored by a 43,970 square-foot Albertsons, the 123,000 square foot Cypress Square anchored by a 60,750 square-foot Raley's and the 31,000 square foot Oakley Shopping Center anchored by a 15,000 square foot Centro-Mart.

Cypress Square has 30 tenants in the center, including Bank of the West, Christina's Nails, Callister's Accounting, Assist 2 Sell, Comm. First Home Loans, Curves, Cypress Cleaners, Cypress Vet Hospital, Delta Sofa & Mattress, Designer Cuts, Giant Donuts, Fagans restaurant, Goodwill, Jack In The Box, Mountain Mike's Pizza, Oakley Super Beauty, State Farm, Sylvan, Taco Bell, Subway, and the UPS Store. Cypress Square is the closest retail center to the Proposed Project, less than a mile from the project site. Based on the discussion of the Proposed Project's supermarket impacts above, it is likely that Raley's sales would drop from baseline levels after opening of the proposed project in 2009. However, given the recovery of market demand through population growth by 2010, it seems unlikely that this short-term impact would force the store to close. With the exception of the fast food restaurants, the center's remaining tenants are local serving and are unlikely to relocate to or be directly competitive with the region-serving uses in the Proposed Project. However, if the center anchor vacates the center, retail traffic to the center will drop and it is possible that other shops will be forced to close or relocate.

Oakley Town Center is anchored by Albertsons and a 31,000 square-foot Rite Aid Pharmacy. There are 19 shops and other tenants include Aladino's Pizza, AutoZone, Burger King, Custom Cleaners, GNC, Gold Chopsticks, Great Clips, Hollywood Video, Nail Salon, Oakley Dental, Radio Shack and a Laundromat. Based on the supermarket and general merchandise (this category includes drug stores) demand estimates for 2010 discussed above, it is possible that opening of the proposed project in 2009 could cause both Albertsons and Rite Aid sales to drop. Given the net demand for these categories even with the proposed project by 2010 it is unlikely that the proposed project would force closure of these outlets. If the anchors vacated the center, retail traffic to the center would drop and it is possible that other shops would be forced to close or relocate. Many tenants are local serving, though Hollywood Video and Radio Shack may face competitive outlets in the Proposed Project (or even choose to relocate there).

Oakley Shopping Center is an older center anchored by Centro Mart. There are 13 stores in the center including Central Bank and other small independent shops. Because of its location farther from the Proposed Project and smaller size, this center may be less vulnerable to the Proposed Project’s overall impacts. Its shops are local-serving small businesses and appear to be tenants that seek low rent. However, this center is aging and faces physical realignment due to a street construction project in the near future. The Centro Mart itself does not appear to have been remodeled in many years and has a somewhat rundown appearance. Combined with sub-par performance, this indicates this particular store may be at risk of closure as a result of competition from the supercenter. However, the growth in overall supermarket demand driven by increases in Oakley’s population indicate enough support for a supermarket; it may not be this particular store in its present form, but instead a remodeled and re-tenanted store that could compete more effectively, perhaps as a market highlighting the convenience of shopping in a small store or through specialized offerings (e.g., ethnic foods, organic items).

Impacts on Other Retail Nodes in the Subregion

The two retail nodes in the Subregion and outside of Oakley likely to be most affected by the proposed project are the 94,841 square-foot Kmart located at 3625 East 18th Street in Antioch and the WinCo center on Lone Tree. As noted above, the WinCo currently achieves very high sales, and could withstand a loss of sales without facing closure. The Kmart is very close to the Proposed Project, less than one-half mile from the project site. It is the discount general merchandise store closest to much of Oakley, and even though it is in Antioch, it probably draws a high proportion of its customers from Oakley. It is a freestanding store (not part of a retail center) though it shares access with a Valero gas station and Burger King fast food restaurant. The store appears to be in below-average condition with light retail traffic at the time of BAE’s site visits. This store faces many challenges given the proximity to the Proposed Project and the general decline of Kmart due to its inability to compete effectively with Target and Wal-Mart throughout the country. By 2010 additional demand for general merchandise store space in Oakley is projected to exceed the 165,000 square feet of competitive space assumed for the Proposed Project, but even by 2015 this excess support will be less than the size of this Kmart. Given this Kmart’s location in Antioch but removed from its population base, and its consequent dependence on Oakley shoppers who would drive by the supercenter in order to reach it, this store is at risk of closure if the Proposed Project with a supercenter is built.

Cumulative Impacts

Per CEQA requirements, the impacts of the Proposed Project must also be assessed in the context of other likely retail developments in the market area or affecting the market area. The discussion below is limited to those foreseeable projects that are deemed competitive with the Proposed Project and thus capable of contributing to any cumulative impacts; the Subregion includes proposals for some smaller retail developments, but these projects do not include the kind of larger anchor stores that would create cumulative effects in tandem with the Proposed Project.

Competitive Projects in Oakley

In the Primary Trade Area (Oakley) there are several sites designated for future retail development; the major project besides the Proposed Project in the development process at this time is a site on Laurel at O'Hare with 85,000 square feet of retail/commercial space proposed, including a Safeway Supermarket and pad space for a gas station and fast food restaurant.[15] Aside from the Safeway-anchored center, there are several other smaller projects in Oakley with applications in the pipeline at this time. These are smaller retail projects with unspecified tenants, or are free-standing restaurants not competitive with the major anchors in the Proposed Project, so determining any cumulative impacts would be highly speculative at this time.

Competitive Projects in the Remainder of Subregion

In the remainder of the Subregion, there are several other proposed developments that could possibly result in substantial cumulative impacts in tandem with the Proposed Project. There is also a region-serving project in Pittsburg that may have cumulative effects in tandem with the Proposed Project. Along with the projects listed below, there are other retail projects in the pipeline in the Subregion, but these projects do not include large region-serving anchor tenants that would be directly competitive with the Proposed Project. As much of the retail mix of the Proposed Project is unknown, any conclusions regarding specific store closure impacts resulting from these other projects would be speculative.

Antioch

Wal-Mart proposed expanding their existing Antioch store to a Supercenter format, but recently the Antioch City Council determined not to certify the Final EIR and denied design review approval for the Wal-Mart expansion project. It is not known at this time if Wal-Mart intends to completely drop the proposal or intends to submit a revised proposal (e.g., a smaller increase in store size) to the city of Antioch. Elsewhere in Antioch, Costco is replacing their existing approximately 115,000 square-foot store with a new 161,000 square foot store. The replacement will occur onsite, and the existing building will be demolished, so the net addition of space is more limited. Also in Antioch, the 30,860 square foot County Square Market, an Asian specialty food market at East Tregellas and Wildflower near Hillcrest and Highway 4, has been approved.

In addition to these supermarket-related proposals, the other proposed project in Antioch that is directly competitive with a major tenant of the Proposed Project is a 104,325 square foot JC Penney department store recently proposed on Empire Avenue near the Slatten Ranch retail center.

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[15] A listing of relevant competitive projects in Oakley and the Subregion can be found in Appendix F.

Brentwood

The Streets of Brentwood at the Highway 4 Bypass and Sand Creek Road is slated to develop as a 460,000 square-foot lifestyle center; the developers have been seeking an upscale supermarket as an anchor tenant. Additionally, it is reported that the closed Brentwood Albertsons will reopen as part of Save-Mart's acquisition of the Albertsons stores in northern California.[16]

Pittsburg

WinCo Foods is currently developing another store in Pittsburg in a 108,000 square-foot existing space in North Park Plaza next to Home Depot. This store, at the eastern edge of Pittsburg, is likely to draw shoppers out of the Subregion, especially Antioch, as it is closer to some Antioch residents than the existing WinCo in Brentwood.

Estimated Cumulative Impacts on Existing Supermarkets

Since most supermarkets are still to certain degree somewhat local-serving, the impacts of the proposed Safeway are considered separately from the potential cumulative impacts of other projects elsewhere in the Subregion. These impacts are likely to be greater than those of the more distant projects.

For purposes of this analysis, it is assumed that the Safeway store will be approximately 58,000 square feet. Opening of the Safeway will create additional competitive pressure on Oakley's existing three supermarkets, making it more likely that these stores would lose sales and be at risk of closure. It should be noted that, based on information provided to City of Oakley, there is no set date for opening the proposed Safeway and it opening could be delayed until after 2010. The ancillary tenants in the project may also compete to some extent with the Proposed Project.

Table 16 provides specific analysis of potential cumulative food store impacts in Oakley as focused on supermarkets. By 2010, average annual sales per square foot at the Oakley's existing supermarkets that year are estimated to decline by three percent, from 2005 levels of $334 per square foot, to an estimated $323.

With projected population growth, sales at the existing outlets are projected to rebound to $386 per square foot in 2015, 16 percent above current levels but slightly below the ULI national benchmark of $392. Since the Raley's and Albertsons are currently performing at sub-par levels, these stores might be at increased risk of closure in this cumulative scenario, especially in the short term. However, as stated above, there appears to be ample long-term demand in Oakley to support these stores above their current sales levels, or replacement stores that perhaps target a market niche differentiated from the supercenter (e.g., ethnic orientation or upscale foods).

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[16] "Save Mart finalizes Albertson's acquisitions," The Stockton Record, February, 24, 2007, http://www.recordnet.com/apps/pbcs.dll/article?AID=/20070224/A_BIZ/702240304/-1/A_BIZ05

Table 16: Cumulative Impact on Existing Oakley Supermarkets, 2005 - 2015

	2005	2010	2015
Oakley Population (a)	29,800	50,600	57,300
Current Supermarket Sales	$40,000,000		
Capture from Leakage (c)	$9,810,000		
Supermarket Sales Potential (a) (b)	$49,810,000	$84,580,000	$95,780,000
Potential Sales per Capita	$1,671	$1,671	$1,671
Existing Supermarket Square Feet	119,720	119,720	119,720
Additional Grocery Store in Project (d)		65,000	65,000
Proposed Safeway		58,000	58,000
Sales per Square Foot in Supercenter Grocery Space (e)		$418	$418
Sales per Square Foot in Proposed Safeway (f)		$323	$386
Estimated Supermarket Sales in New Stores		$45,900,000	$49,560,000
Sales in Existing Outlets (g)	$40,000,000	$38,680,000	$46,220,000
Average Annual Sales per Square Foot at Existing Stores	**$334**	**$323**	**$386**
Percent Change from 2005		**-3%**	**16%**

(a) From Table 2.
(b) All estimates throughout table in 2006 dollars. All total sales estimates rounded to nearest ten thousand.
(c) From Table 9.
(d) Assumed based on typical general merchandise with grocery stores in this format.
(e) Sales per square foot based on average sales per square foot per Wal-Mart, or estimated average sales per square foot in combined new store and existing stores, whichever is higher.
(f) Based on sales per square foot in existing outlets with new stores in place as shown below.
(g) Supermarket sales potential less sales in new stores.

Source: Bay Area Economics 2007, based on information from City of Oakley, State Board of Equalization, 2002 Census of Retail Trade, and Trade Dimensions.

The opening of the other proposed supermarkets and the supermarket component of an expanded Wal-Mart in Antioch will all add to the overall inventory of space serving customers in the Subregion. Table 17 provides an estimated of cumulative impacts with all proposed projects open except the Antioch Supercenter expansion. As shown, it is estimated that in 2010, sales in existing outlets would be at $321 per square foot, or 17 percent below current levels. By 2015, sales in existing outlets would recover to $364 per square foot, only six percent below current levels. On an overall level, this indicates that in the long term the overall market can support additional supermarket space in addition to the current space.

Table 17: Cumulative Impacts on Subregional Supermarkets, no Antioch Supercenter

	2005	**2010**	**2015**
Subregion Population (a)	174,500	207,900	227,300
Current Supermarket Sales (b)	$289,100,000		
Benchmark Sales per Capita	$1,657		
Supermarket Sales Potential (c)	$289,100,000	$344,400,000	$376,600,000
Existing Supermarket Square Feet (d)	749,427	749,427	749,427
Additional Grocery Store Equivalent in Project (e)		65,000	65,000
Other Proposed Supermarkets (excl Antioch Wal-Mart) (f)			
Safeway (Oakley)		58,000	58,000
Streets of Brentwood Gourmet Foods		40,000	40,000
Albertsons reopening in Brentwood		62,441	62,441
Asian Foods (Antioch)		30,860	30,860
WinCo, Pittsburg (1/3 allotted to Trade Area)		36,000	36,000
Sales per Square Foot in Region-Serving Supermarket Space (g)		$418	$418
Sales per Square Foot in Other Proposed Stores (h)		$321	$364
Estimated Supermarket Sales in New Stores		$103,700,000	$103,700,000
Sales in Existing Outlets (i)	$289,100,000	$240,700,000	$272,900,000
Average Annual Sales per Square Foot at Existing Stores	**$386**	**$321**	**$364**
Percent Change from 2005		**-17%**	**-6%**

(a) From Table 2.

(b) All estimates throughout table in 2006 dollars. All total sales estimates rounded to nearest hundred thousand. Based on data provided by Trade Dimensions.

(c) Benchmark sales per capita times population.

(d) From Appendix C.

(e) Assumed based on typical general merchandise with grocery stores in this format.

(f) See Appendix F. Store size for Streets of Brentwood estimated.

(g) Sales per square foot based on average sales per square foot per Wal-Mart, or estimated average sales per square foot in combined new stores and existing stores, whichever is higher. This sales figure is used for new supercenter, Antioch Wal-Mart expansion, and WinCo in Pittsburg.

(h) Based on sales per square foot in existing outlets with new stores in place as shown below.

(i) Supermarket sales potential less sales in new stores.

Source: Bay Area Economics 2007, based on information from City of Oakley, State Board of Equalization, 2002 Census of Retail Trade, and Trade Dimensions.

If the Wal-Mart expansion plan is resubmitted and approved, the sales losses at existing stores are estimated to be larger, as shown in Table 18. In 2010, existing stores are estimated to see a loss of 23 percent of current sales, to an average sales per square foot of $299, improving to a loss of only 11 percent in 2015, for average performance of $342 per square foot. This overall performance, while below current levels, is not a certain indicator of store closures occurring.

However, not all existing stores are performing at average levels; some stores have sales per square foot well below the average for the Subregion, and are thus at greater risk of closure. As noted above, the Raley’s and Centro Mart in Oakley are sub-par in sales, and face some short-term risk of closure from the Proposed Project alone. However, the growth within Oakley, and the convenience-oriented nature of much supermarket shopping (despite the emergence of superstores) indicates that long-term demand in Oakley should sustain either these stores or replacement stores even under either cumulative impacts scenario. Brentwood's growth should sustain the existing stores plus the two additional supermarkets under consideration; in fact, the plans by new owners to re-open the closed Albertsons indicates that food retailers see this as a viable growth market, and indicates that the closure of a supermarkets in the Subregion need not lead to long-term vacancy. The greatest pressure on stores is likely to occur in Antioch, where population growth is slowing as the city builds out. The Asian specialty market may be a regional draw, not particularly impacting any particular store, but the WinCo just across the border to the west in Pittsburg may attract price-conscious shoppers not already drawn to the existing WinCo just outside Antioch to the east in Brentwood. The Proposed Project in Oakley will likely draw some Antioch customers, especially those in the part of that city north of Highway 4 who find it more convenient to shop in Oakley even if the proposed Antioch Wal-Mart expansion ultimately occurs. There are two stores in that portion of Antioch noted in the inventory of competitive supermarkets. The Grocery Outlet reportedly has low sales, but as a regional chain this niche player, depending largely on sales of overstock items at steep discounts, has lower per square foot performance overall than the major regional and national chains, succeeding in part through a lower cost structure based in part on reuse of existing store locations. The Save Mart in north Antioch might lose shoppers to both supercenters as well as the WinCo, but reportedly has relatively strong sales, and should be able to sustain some loss of sales; additionally, it is the only non-niche local-serving full-service supermarket north of Highway 4 in Antioch, an area which includes over one-fourth of Antioch's total population.

Generally, in the absence of the Antioch Wal-Mart expansion, the impacts of the new WinCo in Pittsburg and the Asian specialty food market, in combination with the Oakley supercenter, are likely to be spread among the existing outlets such that it would be speculative to assume one or more Antioch stores face closure. North of Highway 4, the Food Maxx may be the most directly competitive store for the WinCo and the supercenters, but is reported to have strong sales currently. The poorest performing store is the Albertsons on Lone Tree Way, but this store is now under new ownership which may refocus the store successfully. With the addition of the Wal-Mart expansion, the Albertsons on Lone Tree is at risk of closure due to its poor sales currently and its proximity to Wal-Mart, and a long-term oversupply of supermarket space. Because of this proximity and poor sales performance, the Antioch Wal-Mart expansion alone would place this store at risk of closure even without the Proposed Project in Oakley moving forward.

Estimated Cumulative Impacts on General Merchandise Stores

As noted above, there are no region-serving stores in Oakley in this category. The two projects of concern cumulatively in the Subregion are the possible Wal-Mart expansions which would add approximately 20,000 square feet of general merchandise floor space, the Costco expansion, and the proposed JC Penney store.

The Wal-Mart expansion in Antioch does not add a large amount of general merchandise store inventory, and this additional space should be absorbed by Subregional growth outside Oakley. In tandem with the availability of a full line of groceries, this store may attract some Wal-Mart shoppers from outside Oakley who would otherwise go to the Proposed Project, but the current capture estimates for the Oakley store as shown in Table 11 are conservative already. This expansion would increase the competitive pressure on the Antioch Kmart, which is already seen as being at risk of closure from the direct impacts of the Proposed Project. The other major general merchandise stores are differentiated enough that, in combination with regional growth, there should be no risk of store closure if the Antioch Wal-Mart expands in combination with the Proposed Project's supercenter and the other reasonably foreseeable general merchandise stores planned in the Subregion.

The Costco is the only membership club warehouse store in the Subregion serving that specialized market niche; in light of regional growth the cumulative impacts of this additional space should be limited and not lead to closure of other outlets, although it will absorb some of the regional demand in the general merchandise store category.

While proposed the JC Penney is positioned somewhat differently in the market than a supercenter type store, it would compete with the supercenter general merchandise component as well as with any large apparel anchor store. This store might lower the capture rate of non-Oakley shoppers for the Proposed Project, and attract some shoppers from Oakley itself. The capture analysis above, however, has used capture rates that already assume that general merchandise store and apparel store shoppers would frequent other stores in these categories because of the desire for a different shopping experience at a different type of store. This store's position at the eastern edge of Antioch should allow it to attract shoppers from both Oakley and Brentwood who might otherwise go to similar stores (such as Mervyn's and Kohl's), so it is more likely to impact those stores rather than have a cumulative effect linked to the Proposed Project. The overall growth in the Subregion should provide the necessary population base to support a JC Penney in addition to the existing general merchandise outlets of all types as well as the other stores in the pipeline.

In summary, the new Costco and Penney are not likely to have cumulative effects in combination with the Proposed Project that would lead to additional general merchandise store closures. The Antioch Wal-Mart expansion, however, would increase the risk of closure for the Antioch Kmart.

Estimated Cumulative Impacts for Other Retail Store Types

There are no additional plans for competitive home improvement stores in the Subregion for which cumulative effects need to be considered. The proposed center that has a substantial amount of retail space not discussed above is the Streets of Brentwood project. As proposed, this will be a "lifestyle" center, catering to a more upscale market niche than the Proposed Project. While it may draw shoppers from throughout the Subregion, including Oakley, it will compete in a different market niche, and the current capture rates for the Proposed Project take into account the likelihood that shoppers from Oakley and elsewhere in the Subregion will shop in other outlets. Furthermore, the continued population growth in Brentwood and the Subregion should create additional overall retail demand that can be absorbed by this project without causing other store closures or long term vacancies.

Potential for Business Closures

Introduction

Following are analysis and findings regarding the potential for closure of existing businesses, and sustained vacancy of buildings resulting from the Proposed Project. As stated in the Introduction to this report, recent California court decisions have made clear that for large retail developments CEQA requires, as part of the environmental analysis, that an economic impact analysis be completed in order to assess the potential for "urban decay" and deterioration and indirect physical impacts on the environment. The potential for urban decay and physical deterioration within existing retail centers, however, may ultimately be influenced by additional mitigating factors. These include existing municipal programs which provide economic incentives for maintenance of buildings and facilities, and for attraction of replacement uses, as well as direct mitigation measures which may be incorporated into the project through the EIR process. The Draft EIR for the Cline Property Specific Plan analyzes all of these factors in combination and makes a reasoned judgment as to the actual potential for urban decay and physical deterioration.

To fully satisfy the requirements of CEQA, the analysis must look at the economic impacts, and then follow the causal chain to determine the likelihood that new retail space will cause existing space to become vacant, and, if such vacancies are determined likely, to then determine the potential for urban decay and physical deterioration of those existing retail centers and nodes. In the words of *Bakersfield Citizens for Local Control v. City of Bakersfield, Panama 99 Properties LLC, and Castle & Cooke Commercial-CA, Inc.*, the analysis is required to assess whether a new retail development "could cause a ripple of store closures and consequent long-term vacancies that would eventually result in general deterioration and decay within and outside the market area" of the proposed development. Further, "[t]hese effects include, but are not limited to, physical decay and deterioration resulting from store closures in the same market area or in established areas of the community (i.e., the 'traditional downtown area') due to competitive pressures, followed by an inability to easily re-lease the vacated premises." One concern is that large retailers that dominate sales in their merchandise lines "will displace older, smaller retail stores and shopping centers, leaving long-term vacancies that deteriorate and encourage graffiti and other unsightly conditions." The EIR "must analyze the cumulative impacts resulting from construction and operation of the proposed shopping center in conjunction with all other past, present or reasonably foreseeable retail projects that are or will be located within the proposed project's market area" and determine the likelihood that a project "individually and/or cumulatively, indirectly could trigger the downward spiral of retail closures and consequent long-term vacancies that ultimately result in decay."

This report provides conclusions for further analysis in the Draft EIR with respect to whether the Proposed Project, either individually or cumulatively with other development, will have a negative economic impact so severe that stores might close as a result and that those buildings and/or properties, rather than being reused within a reasonable time, would remain vacant, deteriorate, and lead to the decline of the associated or nearby real estate. If no or minimal negative economic impact is found, then urban decay could not be a logical result. Store closures alone are not sufficient to cause urban decay as such closures could provide an opportunity for new retailers or other tenants to occupy the vacated space or for property owners to engage in economic development efforts to improve properties. In addition, as further analyzed in the Draft EIR, even if closures result from implementation of the Proposed Project, the adverse physical effects over time may be mitigated through other factors, including programs to attract replacement tenants and to maintain the physical buildings and facilities.

Direct and Cumulative Economic Impacts

Based on the retail analysis in the previous chapter, the Proposed Project alone may have substantial short-term economic impacts at three retail centers in Oakley, as well as at the Kmart in Antioch. The Raley’s and Centro Mart face greater risk of closure since these stores are currently performing below industry benchmarks. Cumulatively the Proposed Project in conjunction with the proposed Oakley Safeway could lead to greater impacts for a longer period in Oakley. However, the demand analysis indicates that even if one or more of the existing supermarkets closes, long term demand in Oakley should support three supermarkets the size of the existing ones in addition to both the supercenter and the Safeway.

There is also a strong likelihood that the Antioch Kmart would close in the face of competition from the Proposed Project, especially if cumulative impacts including the possible expansion of the Antioch Wal-Mart and the addition of a JC Penney store are considered. Long term demand from Oakley alone is not great enough to support the general merchandise component of the supercenter along with the Kmart just outside Oakley’s city boundary. With the opening of the supercenter in Oakley in combination with the completion of the Highway 4 bypass, this site loses much of its locational advantage.

Additional vacancies scattered throughout Oakley could result from defections of tenants to the new center as they seek out the newest space available, and from closure of existing businesses competing with the new center. However, in the absence of a defined tenant mix for most of the project, any attempt to identify such potential vacancies would be speculative, and growth in the City and the Subregion should sustain reuse of any smaller vacated spaces, which in any case are part of the lifecycle of any retail real estate market. The project impacts might be lessened to some degree to the extent the center develops with a regional retail focus since most existing stores in Oakley are local serving.

Elsewhere in the region, the retail outlet at risk of closure due to cumulative impacts is the Albertsons on Lone Tree Way in Antioch. This store is most at risk if the Wal-Mart expansion proposal is revived; in fact that project alone puts the nearby Albertsons at risk of closure.

Retail Real Estate Market Conditions in Oakley

The next step is to assess the strength of the overall retail real estate market. In a strong market, long-term vacancies are less likely and the causal chain of events creating the potential for urban decay is less likely. At the time of BAE’s site visit, there were no large vacant retail properties, indicating that the market is currently in equilibrium. The Oakley Shopping Center with Centro Mart is somewhat antiquated, and non-retail tenants occupy some of its other spaces. None of the major retail nodes discussed above is experiencing the vacancy of a large anchor space or significant numbers of smaller spaces. An area tour indicates that retail real estate conditions in the Subregion are strong.

BAE contacted retail real estate brokers and other representatives of retail properties in Oakley to better understand market conditions. These brokers (listed in Appendix E) indicated the Proposed Project will likely have a substantial competitive economic impact on Kmart, and possibly Raley's and Albertsons when it opens in 2009. They opined that Oakley has a hodgepodge of retail types in need of long-term retail vision for tenant mix. Older centers on Main Street will probably be bought and redone to compete with newer retail (including the Proposed Project) and serve the growing population from new homes.

Options identified for re-tenanting centers affected by the Proposed Project include a fitness center or a smaller outdoor specialty shop. Other second generation tenants identified include Big Lots, Dollar Tree stores, entertainment-type venues, independent grocery stores, or even multi-family housing; however, most of the possible retail uses rely on lower rents than new projects. Brokers indicated there are always tenants with lower rent thresholds that cannot get into new shopping centers. Overall, the picture was of a retail market with stable conditions currently, but facing substantial challenges if the Proposed Project moves forward.

Findings Regarding Potential for Business Closures and Sustained Vacancies

Overview

The following discussion considers the potential for business closures and sustained vacancies for each of the competing retail nodes discussed above, taking into account the impacts of the Proposed Project and possible cumulative impacts due to other retail development in Oakley and the Subregion. As indicated above, no large anchor retail spaces are currently vacant in Oakley, and BAE's tour of the existing centers found no current evidence of urban decay or physical deterioration resulting from vacancy, deferred maintenance, or disinvestment.

Cypress Square

The Proposed Project, either alone or in conjunction with the proposed Safeway and other projects including the possible Wal-Mart expansion in Antioch, would result in increased supermarket competition, especially in the short term. This period of increased competition could lead to the closure of Raley's, the anchor at Cypress Square, which currently has sales reported below industry benchmarks. However, by 2010, local demand for supermarkets should increase above existing levels even with the supercenter in place, so even if Raley's closes, another supermarket use, perhaps repositioned to a niche less directly competitive with the supercenter, should be feasible, Additionally, there are "second generation" tenants that brokers active in Oakley note as potential reuses for this space. As a result, this analysis does not indicate a likelihood of business closures or long-term vacancies due to the Proposed Project either alone or cumulatively.

Oakley Shopping Center

The Proposed Project, either alone or in conjunction with the proposed Safeway and other projects including the possible Wal-Mart expansion in Antioch, would result in increased supermarket competition, especially in the short term. The main occupant at risk in Oakley Shopping Center is the Centro Mart, since the other tenants are small independent local-serving businesses. This store is underperforming industry benchmarks and is somewhat dated and rundown in appearance. Because of its location (the farthest from the Proposed Project) and smaller size, Centro Mart may be less vulnerable to the Proposed Project's supermarket impacts than Raley's but it is still at some risk in the short term. The other occupants of the center are local-serving and appear to be tenants that seek low rent. Though it is possible the Centro Mart may be forced to close due to competition from the Proposed Project, by 2010 local demand for supermarkets should increase above existing levels even with the supercenter in place. Even if the Centro Mart closes, another supermarket use, perhaps repositioned to a niche less directly competitive with the supercenter, should be feasible. However, like the Centro Mart itself, this center is somewhat antiquated and rundown in appearance. Additional competitive pressure in the market, and any loss of tenants, may push it to the point of closure. As a result, this analysis indicates that implementation of the Proposed Project either individually or cumulatively would create a potential for closure of the Centro Mart, but that re-use of the building appears feasible. The potential for long-term vacancy therefore is small.

Oakley Town Center

The Proposed Project, either alone or in conjunction with the proposed Safeway and other projects including the possible Wal-Mart expansion in Antioch, would result in increased supermarket competition, especially in the short term. Additionally, the Rite Aid store, as the only significant general merchandise store operating in Oakley, may also see competitive pressure from the supercenter, but as a smaller store will offer a convenience level not attainable by the supercenter; and should survive, especially as Oakley's population increases. The Albertsons in the center is estimated to be performing above industry benchmarks, however, and as a result is less likely to face closure in the short term than either the Raley's or Centro Mart. Furthermore, by 2010, local demand for supermarkets should increase above existing levels even with the supercenter in place. As a result, this analysis does not indicate a likelihood of store closures or sustained vacancies due to the Proposed Project either alone or cumulatively.

Big Kmart

The Big Kmart located in Antioch is in close proximity to the Proposed Project, less than one-half mile from the project site. This store faces many current challenges which are potentially elevated given the proximity to the Proposed Project. Additionally, the cumulative impacts of the Proposed Project in conjunction with an expansion of the Wal-Mart Supercenter on Lone Tree Way in Antioch could greatly reduce the market share for this store. Though additional supportable square feet of general merchandise stores in Oakley exceeds the size of the general merchandise component of the proposed supercenter in 2010 and 2015, it is not equivalent to the size of this existing store, and in fact relies on capture of some of its sales from residents of Antioch and Brentwood. Kmart's sales base would likely erode under these circumstances, and the store could potentially cause close.

The site is a larger single user site that would not be encumbered with legacy retail tenants that could hinder redevelopment, and could perhaps be reused as retail or in some other commercial or even industrial use. However, there are a limited number of users seeking this size of space, and this site loses much of its retail locational advantage (i.e., proximity to Oakley) if the Proposed Project is constructed. The site does have high visibility due to its location adjacent to a highway exit, but this advantage will be somewhat diminished subsequent to the completion of the Highway 4 Bypass, which will direct many commuters away from this interchange. Though this site has potential for other reuse due to its visibility and access, there remains the potential for closure and a prolonged period of vacancy.

Other Locations

The other potential closure indicated by the impacts analysis is the Albertsons on Lone Tree Way on Antioch under a cumulative impacts scenario, most notably if the Wal-Mart expansion nearby ultimately occurs following reapplication with the City of Antioch. However, the risk of closure is linked almost entirely to that expansion moving forward rather than from impacts of the Proposed Project. If that store closes, the overall Subregion retail market and regional growth should lead to reuse with either another supermarket or a “second generation” user. Alternatively, the purchase of this Albertsons and others by Save Mart indicates that the store may be repositioned to be more competitive. In either case, long-term vacancy is not a likely outcome.

Appendices

Appendix A: Unemployment and Labor Force Trends in Civilian Labor Force

	Oakley				Contra Costa County			
	Labor Force (a)	Employ-ment	Unemploy-ment	Unem-ployment Rate	Labor Force (a)	Employ-ment	Unemploy-ment	Unem-ployment Rate
2000	13,300	13,000	300	2.4%	500,800	483,000	17,800	3.5%
2001	13,500	13,100	400	2.8%	508,400	487,900	20,500	4.0%
2002	13,500	13,000	500	3.9%	512,900	483,700	29,200	5.7%
2003	13,500	13,000	500	3.7%	512,000	480,800	31,200	6.1%
2004	13,500	13,000	500	3.7%	511,000	483,300	27,700	5.4%
2005	13,500	13,100	400	3.3%	511,900	487,300	24,600	4.8%
2006 (b)	13,800	13,400	400	3.0%	518,500	496,300	22,200	4.3%
Change, 2000-2006								
Number	500	400	100		17,700	13,300	4,400	
Percent	4%	3%	33%		4%	3%	25%	

(a) Civilian Labor Force refers to workers by place of residence. Sum may not equal parts due to independent rounding. Data represent annual averages of monthly employment data.

(b) 2006 data reflect a revised benchmark, and should be compared to prior years' data with caution. As of the time of this research, EDD had not re-benchmarked the older data.

Sources: California Employment Development Department; Bay Area Economics, 2006.

Appendix B-1: Oakley Taxable Retail Sales Trends, 2001 to 2005 (Adjusted for Inflation)

City of Oakley Sales in 2006 $000 (a) (b) (c)	2001	2002	2003	2004	2005
Apparel Stores	$25	#	#	#	$95
General Merchandise Stores	#	#	#	#	#
Food Stores	$19,656	$21,065	$19,306	$17,740	$17,736
Eating and Drinking Places	$12,660	$13,687	$13,865	$14,330	$14,287
Home Furnishings and Appliances	$3,175	$4,431	$4,384	$3,921	$3,913
Building Materials and Farm Implements	$2,138	$1,802	#	#	#
Auto Dealers and Auto Supplies	$5,866	$5,589	$5,927	$7,491	$7,130
Service Stations	#	$19,535	$22,151	$23,274	$26,947
Other Retail Stores	$43,227	$20,416	$21,226	$20,415	$22,005
Retail Stores Total	**$86,748**	**$86,524**	**$86,860**	**$87,172**	**$92,112**

Oakley Sales per Capita in 2006 $ (c) (d)	2001	2002	2003	2004	2005
Apparel Stores	$1	#	#	#	$3
General Merchandise Stores	#	#	#	#	#
Food Stores	$754	$803	$714	$641	$628
Eating and Drinking Places	$486	$522	$513	$518	$506
Home Furnishings and Appliances	$122	$169	$162	$142	$139
Building Materials and Farm Implements	$82	$69	#	#	#
Auto Dealers and Auto Supplies	$225	$213	$219	$271	$253
Service Stations	#	$745	$819	$841	$955
Other Retail Stores	$1,658	$779	$785	$738	$780
Retail Stores Total	**$3,328**	**$3,300**	**$3,212**	**$3,151**	**$3,263**

Population	**26,065**	**26,221**	**27,046**	**27,661**	**28,228**

Notes:
(a) Retail sales have been adjusted to 2006 dollars using the Bay Area Consumer Price Index for All Urban Consumers, published by the U.S. Bureau of Labor Statistics.
(b) Analysis excludes all non-retail outlets (business and personal services) reporting taxable sales.
(c) A "#" sign indicates data supressed to preserve confidentiality due to four or fewer outlets or sales of more than 80% of the category in one store. Suppressed sales have been combined with other retail stores.
(d) Per capita sales calculated based on State Board of Equalization reported sales and annual Department of Finance population estimates benchmarked to the decennial Census.

Sources: State Board of Equalization; U.S. Bureau of Labor Statistics; 2000 U.S. Census; State Department of Finance; State Division of Labor Statistics and Research; Bay Area Economics, 2007.

Appendix B-2: Antioch Taxable Retail Sales Trends, 2000 to 2005 (Adjusted for Inflation)

City of Antioch Sales in 2006 $000 (a) (b) (c)	2000	2001	2002	2003	2004	2005
Apparel Stores	$20,721	$20,679	$21,104	$22,359	$25,951	$33,672
General Merchandise Stores	$215,356	$220,906	$218,903	$227,689	$256,094	$262,839
Food Stores	$61,380	$61,075	$59,968	$56,589	$52,271	$51,460
Eating and Drinking Places	$71,714	$73,965	$76,249	$78,946	$94,725	$94,947
Home Furnishings and Appliances	$14,955	$12,782	$16,887	$18,772	$25,529	$27,299
Building Materials and Farm Implements	$60,192	$64,904	$87,443	$100,395	$110,585	$136,953
Auto Dealers and Auto Supplies	$162,836	$172,119	$165,203	$150,314	$150,883	$144,299
Service Stations	$68,997	$73,701	$66,644	$71,998	$79,464	$80,996
Other Retail Stores	$61,512	$60,907	$60,178	$67,959	$89,915	$92,122
Retail Stores Total	**$737,663**	**$761,037**	**$772,579**	**$795,022**	**$885,417**	**$924,588**

Antioch Sales per Capita in 2006 $ (c)	2000	2001	2002	2003	2004	2005
Apparel Stores	$229	$220	$218	$225	$257	$334
General Merchandise Stores	$2,379	$2,350	$2,257	$2,289	$2,534	$2,605
Food Stores	$678	$650	$618	$569	$517	$510
Eating and Drinking Places	$792	$787	$786	$794	$937	$941
Home Furnishings and Appliances	$165	$136	$174	$189	$253	$271
Building Materials and Farm Implements	$665	$690	$902	$1,009	$1,094	$1,357
Auto Dealers and Auto Supplies	$1,799	$1,831	$1,704	$1,511	$1,493	$1,430
Service Stations	$762	$784	$687	$724	$786	$803
Other Retail Stores	$679	$648	$621	$683	$890	$913
Retail Stores Total	**$8,148**	**$8,096**	**$7,967**	**$7,994**	**$8,761**	**$9,162**

Population	**90,532**	**94,000**	**96,970**	**99,456**	**101,060**	**100,913**

Notes:
(a) Retail sales have been adjusted to 2006 dollars using the Bay Area Consumer Price Index for All Urban Consumers, published by the U.S. Bureau of Labor Statistics.
(b) Analysis excludes all non-retail outlets (business and personal services) reporting taxable sales.
(c) Per capita sales calculated based on State Board of Equalization reported sales and annual Department of Finance population estimates benchmarked to the decennial Census.

Sources: State Board of Equalization; U.S. Bureau of Labor Statistics; 2000 U.S. Census; State Department of Finance; State Division of Labor Statistics and Research; Bay Area Economics, 2007.

Appendix B-3: Brentwood Taxable Retail Sales Trends, 2000 to 2005 (Adjusted for Inflation)

City of Brentwood Sales in 2006 $000 (a) (b) (c)	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
Apparel Stores	$1,169	$1,009	$4,588	$7,472	#	$24,884
General Merchandise Stores	$7,639	$8,687	$9,591	$14,905	$14,467	$14,920
Food Stores	$25,808	$27,742	$28,169	$32,148	$38,415	$40,700
Eating and Drinking Places	$22,759	$24,575	$26,481	$29,125	$32,273	$40,869
Home Furnishings and Appliances	$3,356	$3,443	$5,723	$13,360	$15,709	$19,240
Building Materials and Farm Implements	$20,153	$22,070	$19,079	$19,237	$72,059	$72,800
Auto Dealers and Auto Supplies	$60,855	$55,439	$49,165	$46,299	$48,369	$56,483
Service Stations	$20,719	$22,488	$27,080	$34,161	$42,560	$51,310
Other Retail Stores	$11,085	$12,311	$14,258	$15,179	$50,602	$38,671
Retail Stores Total	**$173,542**	**$177,764**	**$184,135**	**$211,886**	**$314,453**	**$359,876**

Brentwood Sales per Capita in 2006 $ (c) (d)	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
Apparel Stores	$50	$38	$153	$219	#	$592
General Merchandise Stores	$328	$331	$319	$437	$377	$355
Food Stores	$1,108	$1,057	$938	$943	$1,001	$968
Eating and Drinking Places	$977	$937	$881	$854	$841	$972
Home Furnishings and Appliances	$144	$131	$190	$392	$409	$458
Building Materials and Farm Implements	$865	$841	$635	$564	$1,877	$1,731
Auto Dealers and Auto Supplies	$2,612	$2,113	$1,636	$1,357	$1,260	$1,343
Service Stations	$889	$857	$901	$1,002	$1,108	$1,220
Other Retail Stores	$476	$469	$475	$445	$1,318	$920
Retail Stores Total	**$7,448**	**$6,776**	**$6,128**	**$6,212**	**$8,190**	**$8,558**

Population	**23,302**	**26,236**	**30,047**	**34,109**	**38,395**	**42,050**

Notes:
(a) Retail sales have been adjusted to 2006 dollars using the Bay Area Consumer Price Index for All Urban Consumers, published by the U.S. Bureau of Labor Statistics.
(b) Analysis excludes all non-retail outlets (business and personal services) reporting taxable sales.
(c) A "#" sign indicates data supressed to preserve confidentiality due to four or fewer outlets or sales of more than 80% of the category in one store. Suppressed sales have been combined with Other Retail Stores.
(d) Per capita sales calculated based on State Board of Equalization reported sales and annual Department of Finance population estimates benchmarked to the decennial Census.

Sources: State Board of Equalization; U.S. Bureau of Labor Statistics; 2000 U.S. Census; State Department of Finance; State Division of Labor Statistics and Research; Bay Area Economics, 2007.

Appendix B-4: Contra Costa County Taxable Retail Sales Trends, 2000 to 2005 (Adjusted for Inflation)

Contra Costa County Sales in 2006 $000 (a) (b)	2000	2001	2002	2003	2004	2005
Apparel Stores	$392,645	$381,374	$387,714	$402,178	$432,628	$465,876
General Merchandise Stores	$1,887,075	$1,854,932	$1,825,715	$1,833,134	$1,888,564	$1,899,782
Food Stores	$632,115	$643,295	$634,047	$628,267	$628,149	$626,638
Eating and Drinking Places	$967,012	$968,285	$979,381	$989,412	$1,046,771	$1,082,766
Home Furnishings and Appliances	$534,169	$502,503	$501,759	$508,423	$518,460	$499,497
Building Materials and Farm Implements	$897,576	$947,461	$957,537	$993,663	$1,137,355	$1,127,503
Auto Dealers and Auto Supplies	$2,046,385	$2,072,848	$2,027,770	$1,865,412	$1,903,295	$1,917,496
Service Stations	$952,778	$872,867	$810,017	$813,654	$969,950	$1,077,321
Other Retail Stores	$1,731,635	$1,608,137	$1,679,568	$1,579,166	$1,679,499	$1,698,187
Retail Stores Total	**$10,041,390**	**$9,851,703**	**$9,803,509**	**$9,613,309**	**$10,204,672**	**$10,395,066**

CC County Sales per Capita in 2006 $ (c)	2000	2001	2002	2003	2004	2005
Apparel Stores	$414	$394	$394	$404	$429	$457
General Merchandise Stores	$1,989	$1,918	$1,856	$1,840	$1,873	$1,864
Food Stores	$666	$665	$645	$631	$623	$615
Eating and Drinking Places	$1,019	$1,001	$996	$993	$1,038	$1,062
Home Furnishings and Appliances	$563	$520	$510	$510	$514	$490
Building Materials and Farm Implements	$946	$980	$974	$997	$1,128	$1,106
Auto Dealers and Auto Supplies	$2,157	$2,144	$2,062	$1,873	$1,888	$1,882
Service Stations	$1,004	$903	$824	$817	$962	$1,057
Other Retail Stores	$1,825	$1,663	$1,708	$1,585	$1,666	$1,666
Retail Stores Total	**$10,583**	**$10,189**	**$9,969**	**$9,650**	**$10,122**	**$10,200**

Population	**948,816**	**966,897**	**983,439**	**996,159**	**1,008,178**	**1,019,101**

Notes:

(a) Retail sales have been adjusted to 2006 dollars using the Bay Area Consumer Price Index for All Urban Consumers, published by the U.S. Bureau of Labor Statistics.

(b) Analysis excludes all non-retail outlets (business and personal services) reporting taxable sales.

(c) Per capita sales calculated based on State Board of Equalization reported sales and annual Department of Finance population estimates benchmarked to the decennial Census.

Sources: State Board of Equalization; U.S. Bureau of Labor Statistics; 2000 U.S. Census; State Department of Finance; Bay Area Economics, 2007.

Appendix B-5: California Taxable Retail Sales Trends, 2000 to 2005 (Adjusted for Inflation)

California Sales in 2006 $000 (a) (b)	2000	2001	2002	2003	2004	2005
Apparel Stores	$15,471,235	$15,510,553	$15,868,601	$16,782,190	$18,267,540	$19,441,769
General Merchandise Stores	$55,189,251	$54,670,935	$54,844,119	$55,887,328	$58,107,838	$59,001,460
Food Stores	$22,127,064	$21,807,183	$21,436,175	$21,456,653	$21,357,855	$21,952,333
Eating and Drinking Places	$42,704,201	$42,689,902	$43,072,564	$44,277,635	$46,619,220	$48,222,627
Home Furnishings and Appliances	$16,369,029	$15,445,365	$15,816,668	$16,698,727	$17,673,109	$18,066,743
Building Materials and Farm Implements	$29,871,387	$30,655,435	$31,755,132	$33,934,010	$39,999,562	$41,203,905
Auto Dealers and Auto Supplies	$68,313,771	$70,409,000	$72,188,884	$74,130,650	$76,238,087	$76,471,319
Service Stations	$30,357,796	$28,528,182	$27,065,652	$30,640,392	$35,291,207	$40,070,377
Other Retail Stores	$65,292,778	$60,832,965	$59,109,596	$60,213,896	$63,678,698	$66,031,512
Retail Stores Total	**$345,696,512**	**$340,549,519**	**$341,157,391**	**$354,021,480**	**$377,233,116**	**$390,462,045**

California Sales per Capita in 2006 $ (c)	2000	2001	2002	2003	2004	2005
Apparel Stores	$457	$450	$452	$470	$504	$529
General Merchandise Stores	$1,629	$1,587	$1,563	$1,566	$1,603	$1,606
Food Stores	$653	$633	$611	$601	$589	$598
Eating and Drinking Places	$1,261	$1,239	$1,228	$1,241	$1,286	$1,313
Home Furnishings and Appliances	$483	$448	$451	$468	$488	$492
Building Materials and Farm Implements	$882	$890	$905	$951	$1,104	$1,122
Auto Dealers and Auto Supplies	$2,017	$2,044	$2,057	$2,077	$2,103	$2,082
Service Stations	$896	$828	$771	$858	$974	$1,091
Other Retail Stores	$1,928	$1,766	$1,685	$1,687	$1,757	$1,798
Retail Stores Total (b)	**$10,206**	**$9,888**	**$9,723**	**$9,919**	**$10,408**	**$10,631**

Population	**33,873,086**	**34,441,561**	**35,088,671**	**35,691,472**	**36,245,016**	**36,728,196**

Notes:
(a) Retail sales have been adjusted to 2006 dollars using the California Consumer Price Index for All Urban Consumers, published by the State Department of Finance, based on data from the U.S. Bureau of Labor Statistics.
(b) Analysis excludes all non-retail outlets (business and personal services) reporting taxable sales.
(c) Per capita sales calculated based on State Board of Equalization reported sales and annual Department of Finance population estimates benchmarked to the decennial Census.

Sources: State Board of Equalization; U.S. Bureau of Labor Statistics; 1990 and 2000 U.S. Census; State Department of Finance; Bay Area Economics, 2007.

Appendix C: Competitive Supermarkets in Oakley and Subregion

Store/Location	Square Feet
OAKLEY	
Raley's *Main St. & Big Break Rd.*	60,750
Albertson's *Empire Ave. & Main St.*	43,970
Centro Mart *Main St. & Vintage Pkwy.*	15,000
Total Grocery Store SF Oakley	***119,720***
ANTIOCH	
Food Maxx *Delta Fair Blvd. & Buchanan Rd.*	49,950
Save Mart *Contra Loma Blvd. & Longview Rd.*	50,355
Raley's *Lone Tree Way & Davison Dr.*	50,000
Grocery Outlet *A St. & 18th St.*	21,162
Save Mart *E 18th St. & Evergreen Ave.*	32,462
Safeway *Hillcrest Ave. & Deer Valley Rd.*	52,866
Albertson's *Lone Tree Way & Deer Valley Rd.*	65,741
Total Grocery Store SF Antioch	***322,536***
BRENTWOOD	
Centro Mart *Brentwood Blvd. & Village Dr.*	15,000
Safeway *Brentwood Blvd. & 2nd St.*	45,886
Raley's *Sand Creek Rd. & SR 4 Bypass*	71,680
Trader Joe's *5451 Lone Tree Way*	12,060
Safeway *Balfour Rd. & Fairview Ave.*	65,589
WinCo *Lone Tree Rd.*	96,956
Total Grocery Store SF Brentwood	***307,171***
Total Supermarket SF in Subregion	**749,427**

Sources: Contra Costa County Assessor's Office; Supervalu; Trade Dimensions; Cities of Antioch, Brentwood, and Oakley; Bay Area Economics, 2007.

Appendix D: Notes and Sources for Tables 8 and 9

The Subregion includes the Cities of Oakley, Antioch and Brentwood. This area's sales are used as benchmark for estimating leakage in Oakley. The wide range of retail available within the Subregion, and the distance from most other retail centers, and the similar demographic character of the Subregion and Oakley make this a reasonable and conservative assumption.

(a) From Table 6, except for general merchandise, building materials, and other retail. General merchandise per capita for Oakley not available; the estimated total sales are based on estimated sales for the Rite Aid, the only significant general merchanise store in Oakley. Sales estimated based on national Rite Aid sales per square foot times size of Oakley store. Building materials assumed to be zero, based on closure of hardware store that was the only significant retailer in this category in Oakley. Other retail stores total has been adjusted to factor out general merchandise and building materials stores sales that were combined with this total in Table 6.

(b) 2005 per capita taxable sales times 2005 population. 2005 population data from Table 2.

(c) Sales have been adjusted to take into account non-taxable items for food and drug stores.

Sales for Oakley for general merchandise stores have been estimated based on size of Rite Aid and national average sales per square foot for Rite Aid, from 2006 Annual Report.

Total Stores	3,323	
Average SF per store	12,800	
Total SF	42,534,400	
FY 2006 Sales	$17,270,968	(in $000)
Sales per SF	$406	
Size of Oakley Store	31,472	
Estimated Sales	$12,779,113	

Sales for general merchandise for Subregion assume 10% of total sales are non-taxable, based on Product Line Sales from the 2002 Economic Census. The food items category includes soft drinks and other items that are taxable, so the overall percentage has been lowered to 10 percent to be conservative.

	Non-discount dept stores	Discount dept stores
Total 2002 Sales in $000	$220,742,882	$133,886,174
Food Items	$9,315,222	$9,135,885
Prescriptions	$29,117,730	$8,361,597
Food & Drug	$38,432,952	$17,497,482
Food & drug as % of total	17%	13%

Taxable food store sales have been adjusted using the proportion of taxable and non-taxable sales as noted in Table 7.

% of Total Sales that are Taxable	Oakley	Subregion
Food Stores	38%	33%
General Merchandise	na	90%
2005 Population	29,800	174,500

Subregion's per capita sales have been assumed as baseline against which to compare the Trade Area. Sales assumed to be "leaking" from the Trade Area if that area has per capita sales below county benchmark. Assumptions have been made regarding possible capture by the proposed project of leakage in each category; for instance, the Trade Area is unlikely to achieve 100 percent capture of general merchandise sales, because some general merchandise shopping is mall-based, and and Oakley shoppers seeking mall stores are likely to go to Antioch, Concord, or elsewhere. The project is assumed not to capture any sales in service stations and automotive retail.

Sales per square foot in relevant categories has been derived as follows:

Apparel Stores	Based on Kohl's 2006 Annual Report.
General Merchandise Stores	Average sales per square foot for Wal-Mart, from 2007 Annual Report
Food Stores	Average sales per square foot for Wal-Mart, from 2007 Annual Report.
Eating and Drinking Places	Average of high and low sales data from HdL for various restaurant categories.
Home Furnishings and Appliances	Based on mix of HdL highs and lows and ULI data for a mix of store types in this category.
Building Materials and Farm Implements	Average of Lowe's and Home Depot averages from 2006 Annual Reports.
Auto Dealers and Auto Supplies	n/a
Service Stations	n/a
Other Retail Stores	ULI national median sales per square foot for all types of retail in supercommunity/community shopping centers, from Dollars and Cents of Shopping Centers, 2006.

Sales injections and capture amounts rounded to nearest hundred thousand dollars. Additional supportable square footage rounded to nearest thousand.

Sources: Bay Area Economics 2007, based on information from the CA State Board of Equalization, 2000 U.S. Census, 2002 Census of Retail Trade, Association of Bay Area Governments, City of Oakley, Urban Land Institute, Wal-Mart, Home Depot, Lowe's, Rite-Aid, and Kohl's Annual Reports, and Hinderliter de Lamas (HdL).

Appendix E: Broker Interviews

Deborah Perry, Colliers International
(925) 279-5561

- The retail market is very limited; there is only Raley's and other small centers. Overall vacancy rate is about three percent.
- Oakley is the next city to really start growing after Antioch and Brentwood, and housing development will fuel an increase in retail.
- Wal-Mart will draw people from Antioch, Pittsburg and Brentwood.
- It will impact Kmart substantially down the street, and possibly impact Raley's and Albertsons when first opening.
- Ultimately there is enough growth to support all groceries, even with Safeway on Laurel and O' Hare planned in 18 months.
- The Kmart's location has potential to be considered by Target or Lowe's home improvement store. There are eventually going to be more retailers and additional parcels looked at for retail along Highway 4.

Steven Rusher, Cornish & Carey
(925) 974-0115

- Oakley is right now where Brentwood was about five years ago – it's trailing the others a little, but the Economic Director is experienced in building cities through similar growth stages, and the city seems like a very pro-commercial environment, with both the population and City Council looking to build up the commercial base.
- Oakley has a hodgepodge of "mom and pop" businesses, with individualistic uses located next to each other in direct competition; there is a lack of a long-term vision for tenant mix. Older centers on Main Street will probably be bought and redone in the future to compete with the Wal-Mart retail center; property owners should be approached about serving the population by focusing on building stronger commercial services for the newly built residences. Oakley's residents most likely go to the west side of Brentwood instead of staying in town to shop.
- Across the street from the project site, there is a potential home improvement store anchored center, with a big multifamily project, in early stage activity of development. North of that Dupont site, office, flex, and industrial space will be built. South of Main Street, there will be over 1 million square feet of industrial space. Overall vacancy rate is very low, below five percent.
- There are concerns about rising housing prices and interest rates, as well as about the levees and perceptions of the levees in Oakley. A lot of the east county retail boom was based on speculation of higher than market rents.
- There is a potential that the Albertsons could shut down; that will bring up a big box space. It could be difficult to find an anchor with a big enough draw. Possible options could include a fitness center or a smaller outdoor specialty shop. The Kmart lot is in a more industrial area; if it closed, a cold storage site is more appropriate. Also, there is a maturing market for office space along 18th north in Antioch.

Marilyn Hansen, Grubb & Ellis
(408) 452-5900

- The Oakley retail real estate market is very strong, because of the continued residential growth in the area. Overall vacancy rate is about eight to 10 percent.
- The development makes it a very attractive middle income area that is more affordable than most of the Bay Area. The housing development attracts families with two to three kids looking for bigger houses.
- It will probably not be very difficult to re-lease an empty box, depending on where it is located and whether or not the property owner is willing to divide it up; probably will be leased with in an eight to 10 month period. Most new commercial development is in Brentwood on Lone Tree, while older spaces are north of the highway.
- Second generation space usually has far lower rents than new projects, which works for retailers like Big Lots, Dollar Tree stores, entertainment-type venues, other grocery stores, or even multi-family housing. There are always tenants with lower rent thresholds that cannot get into new shopping centers.
- The supercenter use will affect the “mom and pop” small businesses the most; franchise-driven shopping centers, small hardware stores, and bookstores will probably be polished off because they lack buying power. Do not expect a lot of effect on existing shopping centers.
- Supercenter uses attract a different type of shopper than Safeway or other stores.
- Overall, Oakley’s retail market has continued to be very strong; the only potential problem would be if the residential market slowed.

Appendix F: Key Planned and Proposed Competitive Retail Projects

OAKLEY	Size (Square Feet)	Comments
Vintners Square *Laurel & O'Hara*	85,000	Approved, but no set date for construction commencement 58,000 square feet for Safeway component
ANTIOCH		
Wal-Mart Expansion *4893 Lone Tree Way*	72,890	Recently failed to receive approval from Antioch City Council Approximately 50,000 square feet of additional grocery space
Costco Expansion *2201 Verne Roberts Circle*	161,000	Replacement/expansion onsite of existing 115,000 square foot store
County Square Market *East Tregellas and Wildflower*	30,860	Asian specialty food market; approved
JC Penney *Empire Ave. east of future Slatten Road*	128,325	Application currently deemed incomplete 104,325 s.f. Penney store, 24,000 s.f. other retail pads
BRENTWOOD		
Streets of Brentwood *State Route 4 Bypass & Sand Creek Rd.*	460,000	"Lifestyle" center slated to include a supermarket
Albertsons *Walnut Blvd. & Balfour Rd.*	62,441	This recently closed supermarket is reportedly going to be reopened by Save Mart, which recently also acquired all the operating Albertsons in Northern California
PITTSBURG		
WinCo *North Park Plaza (with Home Depot)*	108,000	Reuse of big box space; currently under construction

Sources: Cities of Oakley, Antioch, and Brentwood; Contra Costa County Assessor.

Appendix G: New Housing Development in City of Oakley

CITY of OAKLEY
A PLACE for FAMILIES in the HEART of the DELTA

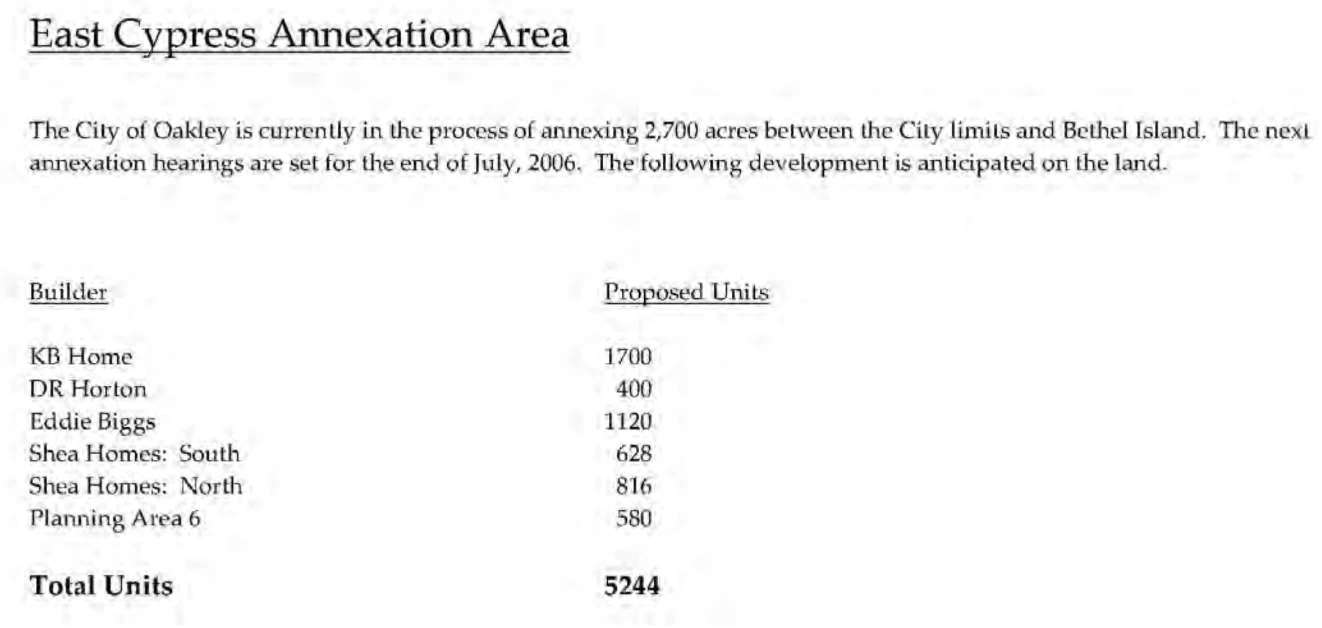
Oakley New Housing Summary

Approved/Under Construction	3305
Application Received	1869
Pre-Submittals	510
East Cypress Annexation Area	5244
Total Units	**10,928**

Approved/Under Construction: Last Updated 6/30/06

6963	Parklands - Hawkeye Builders	East End of Laurel Rd	Jan. 2000		197
7359	Quail Glen - Discovery	4195 Live Oak Ave	Aug. 2002		36
7426/7590/7655/7760	Monarch Ranch (Amberwood) - West Coast	4400 Live Oak Ave	Feb. 1992		182
7599	Carpenter on Live Oak	4660 Live Oak Ave	March.2001		11
7662	Stonewood - Seeno	Rose Lane	August 1999		215
7681	Cinnamon Ridge - Seeno	Carpenter Rd	May 2004		40
8168/7657	Laurel Woods - Western Pacific	1779 Laurel Rd			220
8530	Ryder Homes - Brownstone	791 Brownstone Rd	9/7/2004		86
8541	Ryder Homes	5373 Main St	Nov. 2003		354
8541	Cortina - Standard Pacific	Main St.	6/6/2005		(121)
8541	Sagewood - Ryder Homes	Main St.	6/6/2005		(86)
8541	Tanglewood - Meritage	Main St.	3/7/2005		(147)
8656	Day Break Development	Coventry Dr	8/18/03		6
8678, 8679, 8680	Cypress Grove - KB, Western Pacific, PC	240 East Cypress	Oct. 2003		637
8734	Seeno Homes	Grapevine Ln			28
8737	Teton Group	East of Marsh Creek/ South of Subdiv 6963	4/12/2004		172
8790	DCM Group-Ryder	Brownstone Rd	11/15/2004		20
8731	Magnolia Park - Pulte Homes	West of Freedom HS	3/14/2005		396
8823	Beldin Lane 1 - Jeffrey Olson	Beldin and Oakley Rd.	3/28/2005		6
8843	Beldin Lane 2 - Roy Griffin/Reggie Barker	Beldin Lane	3/28/2005		13
MS 04-978	Zel Debelich	140 Hill Ave	6/20/2005		3
	Biacalana - 2nd Residence	4427 Biacalana-Henrypoint	6/20/2005		
	Meritage Tree Permit	E. of Gehringer School	6/13/2005		0
MS 04-980	Beers Minor Subdivision	30 W. Cypress Place	6/27/2005		3
8916	Heartwood Estates	Mellowwood/Clearwood	7/11/2005		41
8876	West of Gehringer School - JMH Weiss	South Simoni Ranch Rd.	8/1/2005		21
MS 03-978	Hernandez	60 Douglas Rd.	7/18/2005		4
	Eagle City Expansion	2333 Main St.	7/18/2005		n/a

8728	Calandev - Stewart Fahmy	Fuscia Ave	10/3/2005		30
8981	Perkins - Ryder Homes	Rose Ave next to SD 8541	11/14/2005		16
8973	Ponderosa Homes	Sellers, south of Railroad	11/14/2005		176
8736	Pheasant Meadows - Discovery Builders	1860 O'Hara	1/9/2005		44
MS 05-978	Michelle Lane	300 Michelle Lane	6-Mar-06		4
MS 04-977	Thompson	151 Hill	4-Apr-05		3
9027	Duarte Ranch – Heartwood Communities	Laurel/Rose	5-22-06		116
8790	Centex Homes - modify existing TM from 20-24	Brownstone Rd	5-22-06		23
8904	Tuscany Estates - D.R. Horton	Cypess Road/Sellers	3-3-06		97
8985	Clyde Miles Construction - Lois Lane	Lois Lane			11
9016	De Jesus - Global Investments	Sellers, north of railroad			78
8836	Vintner View - Discovery Builders	Grapevine Ln			16
	Applications Received (Not Approved)				
8787	Rosewood Estates - Discovery Builders	Laurel Rd			60
8803	Brownstone 10 - DCM Group	Brownstone Rd			50
8807	Villa Grove - Discovery Builders	2080 O'Hara			50
MS 06-979	Laniohan	91 Lozoya Way			3
8983	Baca - Magnolia Gardens	Neroly Rd			125
8980	Brownstone Estates	301 Brownstone			96
9015	Cosetti & Creson - Global Investments	4219 Machado Lane			98
9043	Empire -Discovery Builders	Empire Rd./Carpenter			16
9044	Laurel - Discovery Builders	Laurel near Rose Ave.			20
9013	Pulte - Magnolia Park II	Vintage & O'Hara			22
9080	KB Home - Teal Cove II	Cypress Grove/ Frank Hengel			27
9034	Burroughs Ranch – DR Horton	E. Cypress/Sellars			176
9032	Emerson - Dutch Slough - Ponderosa & Centex	Cypress Road/Sellers			624
8975	Meritage Homes	Main St./Simoni Ranch Rd.			75
9085	Silverwing	Honey Lane			55
	Corporation for Better Housing	Carol Lane			372
	Pre-Applications Received - No Formal Submittals				
no number yet	Gilbert - Castle/Ryder	Cypess Road/Sellers			506
no number yet	Subdivision	4761 Live Oak			4



East Cypress Annexation Area

The City of Oakley is currently in the process of annexing 2,700 acres between the City limits and Bethel Island. The next annexation hearings are set for the end of July, 2006. The following development is anticipated on the land.

Builder	Proposed Units
KB Home	1700
DR Horton	400
Eddie Biggs	1120
Shea Homes: South	628
Shea Homes: North	816
Planning Area 6	580
Total Units	**5244**

City of Oakley Residential Projects

3/21/2007

A. Tentative Tract Number	B. Development	C. Project Location	D. Date of Approval	E. Reso. Number	F. Approved Lots/Units	G. Building Permits
	Built out					
7467/7235/7358	Meritage	Live Oak Ave	6/4/2001		57	57
7630	Western Pacific	Empire Ave	Feb. 2000		128	128
7656	Richmond American Homes	Winchester Dr	2/11/1992		38	38
7689	KB Home	Malicoat Ave	3/17/1995		225	225
8403	Western Pacific	Brown Rd	2/26/2001	CC 10-01	72	72
7797	Della Pointe - Castle Company	111 East Cypress	10/12/1999		98	98
8504	Amador Estates - KB Homes	555 Honey Lane	9/23/2002		12	12
8569	Habitat for Humanity	Norcross Lane	April. 2004		6	6
8727	Allen Property - KBHomes	260 Raye Ave	7/14/2003		27	27
8752	Parklands at Laurel Creek - Hawkeye Builders	East of Subdiv 6963/ East End of Laurel Rd	6/28/2004		10	10
MS 01-978	Larry and Mary Pate	Neroly Rd			4	4
8765	Foreman St. - KB Homes	27 Foreman St	4/12/2004		25	25
8725	Montevino - Richmond American	2200 Oakley Rd			48	48
6968	Meritage	O'hara/Carpenter	7/10/2000		42	42
8655	Western Pacific	Empire Ave			32	32
6963	Parklands - Hawkeye Builders	East End of Laurel Rd	Jan. 2000		197	192
8168/7657	Laurel Woods - Western Pacific	1779 Laurel Rd			220	220
7359	Quail Glen - Discovery	4195 Live Oak Ave	Aug. 2002		36	36
	Approved				**1241**	
7426/7590/7655/7760	Monarch Ranch (Amberwood) - West Coast	4400 Live Oak Ave	Feb. 1992		177	94
7599	Carpenter on Live Oak	4660 Live Oak Ave	March,2001		11	0
7662	Stonewood - Seeno	Rose Lane	August 1999		215	0
7681	Cinnamon Ridge - Seeno	Carpenter Rd	May 2004		40	39
8530	Ryder Homes - Brownstone	791 Brownstone Rd	9/7/2004		67	42
8541	Ryder Homes	5373 Main St	Nov. 2003		354	
8541	Cortina - Standard Pacific	Main St.	6/6/2005	PC 24-05	(121)	46
8541	Sagewood - Ryder Homes	Main St.	6/6/2005	PC 23-05	(86)	48
8541	Tanglewood - Meritage	Main St.	3/7/2005	PC 11-05	(147)	75
8656	Daybreak Development	Coventry Dr.	8/18/2003		6	
8678, 8679, 8680	Cypress Grove - KB, Western Pacific, PC	240 East Cypress	Oct. 2003		541 SFD/ 96 MF	262 SFD/96 MF
8734	Seeno Homes	Grapevine Ln			28	
8737		East of Marsh Creek/ South of Subdiv 6963	4/12/2004		172	32
8790	DCM Group-Ryder	Brownstone Rd	5/8/2006	CC 77-06	23	0
8731	Magnolia Park - Pulte Homes	West of Freedom HS	3/14/2005	CC 09-05	396	132
8823	Beldin Lane 1 - Jeffrey Olson	Beldin and Oakley Rd.	3/28/2005	CC 28-05	6	6
8843	Beldin Lane 2 - Roy Griffin/Reggie Barker	Beldin Lane	3/28/2005	CC 29-05	13	6
8836	Vintner View - Discovery Builders	Grapevine Ln	5/22/2006	CC 82-06	16	
MS 04-978	Zel Debelich	140 Hill Ave	6/20/2005	PC 27-05	3	0
	Biacalana - 2nd Residence	4427 Biacalana-Henrypoint	6/20/2005			
	Meritage Tree Permit	E. of Gehringer School	6/13/2005		0	0
MS 04-980	Beers Minor Subdivision	30 W. Cypress Place	6/27/2005		3	
8916	Heartwood Estates	Mellowwood/Clearwood	7/11/2005	CC 69-05	41	11
8876	West of Gehringer School - JMH Weiss	South Simoni Ranch Rd.	8/1/2005	CC 78-05	21	0
MS 03-978	Hernandez	60 Douglas Rd.	7/18/2005		4	
	Eagle City Expansion	2333 Main St.	7/18/2005		n/a	
8728	Calandev - Stewart Fahmy	Fuscia Ave	10/3/2005	PC 35-05	30	
8981	Perkins - Ryder Homes	Rose Ave next to SD 8541	11/14/2005	CC 109-05	16	
8973	Ponderosa Homes	Sellers, south of Railroad	11/14/2005	CC 117-05	176	
8736	Pheasant Meadows - Discovery Builders	1860 O'Hara	1/9/2005	CC 125-05	44	
MS 05-978	Michelle Lane	300 Michelle Lane	3/6/2006	PC 04-06	4	
MS 04-977	Thompson	151 Hill	4/4/2005	PC 16-05	3	1
9027	Duarte Ranch - Heartwood Communities	Southeast Corner Laurel/Rose	5/22/2006	CC 76-06	116	
8790	Centex Homes - modify existing TM from 20-24	Brownstone Rd	5/22/2006	CC 77-06	(23)	
8904	Tuscany Estates - D.R. Horton	Cypess Road/Sellers	3/3/2006	PC 08-06	97	
8985	Clyde Miles Construction - Lois Lane	Lois Lane			11	
9015	Cosetti & Creson - Global Investments	4219 Machado Lane	9/11/2006	CC 114-06	98	
9016	De Jesus Property- Global Investments	Sellers, north of railroad	3/27/2006	CC 53-06	78	
9080	KB Home - Teal Cove II	Cypress Grove/ Frank Hengle Way	8/14/2006	CC 112-06	26	
MS 06-976	Hooper Property	2836 Stirrup Drive	9/5/2006	PC 20-06	2	
MS 06-977	Dyer Property	115 Douglas Road	10/16/2006	PC 26-06	2	
9014	Cutino Property Ryder Homes	Within 8541/Cedar Glenn Drive	10/27/2006	PC 27-06 CC 141-06	20	
9043	Aspen Lane -Discovery Builders	Empire Rd./Carpenter	11/27/2006	CC 146-06	16	
	Corp for Better Housing	Carol Lane			162 Sr/154 Low Income	
9030	Jeff Olson	3930 Marsh Way	12/11/2006	CC 28-06	6	
	Applications Received (Not Approved)				**4024**	
8787	Rosewood Estates - Discovery Builders	Laurel Rd			60	
8803	Brownstone 10 - DCM Group	Brownstone Rd			50	
8807	Villa Grove - Discovery Builders	2080 O'Hara			50	
8983	Baca - Magnolia Gardens	Neroly Rd			125	
8980	Brownstone Estates	301 Brownstone			96	
9044	Laurel - Discovery Builders	Laurel near Rose Ave.			20	
9013	Pulte - Magnolia Park II	Vintage & O'Hara			22	
9032	Emerson - Dutch Slough - Denova	Cypress Road/Sellers			624	
9034	Burroughs Ranch - Dutch Slough - DR Horton	E. Cypress/Sellers			176	
8975	Meritage Homes	Main St./Simoni Ranch Rd.			75	
9085	Silverwing	Honey Lane			55	
MS 06-979	Laniohan Property	91 Lozoya Way			3	
MS 06-982	Candelario Barragan	3239 Doyle Road			4	
9052	John Mederos	4761 Live Oak			4	
	Corp. For Better Housing - Density Bonus	Main St./Carol Lane			88 (cottages)	
TM 9156	Edward Biggs	East Cypress Annexation Area			1200	
MS 06-984	Ellison Property	5111 Sellers Ave.			3	
	Pre-Applications Received - No Formal Submittals				**2567**	
9033	Gilbert - Castle/Ryder	Cypess Road/Sellers			506	

Appendix H: Competitive General Merchandise Stores and Home Improvement Centers in Subregion

Store/Location

ANTIOCH
Big Kmart
3625 East 18th Street

Target
5769 Lone Tree Way

Costco
2201 Verne Roberts Circle

Somersville Towne Center
(Sears, Mervyns, Macy's, Gottschalks, etc.)
2556 Somersville Road

Mervyns
5849 Lone Tree Way

Lowe's
1951 Auto Center Drive

Lowe's
5501 Lone Tree Way

Orchard Supply Hardware
2388 Buchanan Road

Orchard Supply Hardware
4873 Lone Tree Way

BRENTWOOD
Kohl's
5511 Lone Tree Way

Home Depot
5631 Lone Tree Way

PITTSBURG
Target
4301 Century Boulevard

Sources: Bay Area Economics, 2007.

Appendix I

City Council Resolution No. 76-02 Dated December 16, 2002 Adopting the Oakley 2020 General Plan, Related Mitigation Findings, Findings Regarding Alternatives, a Statement of Overriding Considerations and a Mitigation Monitoring Program (Mitigation Monitoring Program not included in Appendix)

RESOLUTION NO. 76-02

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF OAKLEY ADOPTING THE OAKLEY 2020 GENERAL PLAN AND RELATED MITIGATION FINDINGS, FINDINGS REGARDING ALTERNATIVES, A STATEMENT OF OVERRIDING CONSIDERATIONS, AND A MITIGATION MONITORING PROGRAM

WHEREAS, in November 1998, the voters approved the incorporation of the City of Oakley, to be effective July 1, 1999, and the City was incorporated on July 1, 1999. After incorporation, the City adopted the Contra Costa County General Plan for the Oakley area as its general plan, the County's subdivision ordinance as its subdivision ordinance, and the County's zoning ordinance as its zoning ordinance (Ordinance Nos. 1-99, 17-99, 22-99). Since that time, the City has been in the process of preparing its own general plan, as required by Government Code Section 65360 (the "Project"); and

WHEREAS, in December 2000, the City Council directed staff to explore the possibility of expanding the City's sphere of influence, and the Contra Costa Local Agency Formation Commission directed the City to include in the environmental impact report for the Oakley 2020 General Plan the areas proposed to be included in the expanded sphere. As a result, the Project area boundaries include the current City and approximately 3,000 acres located east of the current City limits, described as the Expansion Areas in the General Plan; and

WHEREAS, in accordance with Section 65351 of the California Government Code, since December 2000, the City has facilitated public participation in the general plan adoption process through the following steps:

- On December 4, 2000, the City's consultant, Pacific Municipal Consultants (PMC) conducted a general plan vision workshop at which 55 members of the public, including the seven members of the Planning Commission, engaged in a series of exercises that allowed them to share information and opinions about such matters as existing City resources, circulation, land use, recreation, and local character.
- On February 5, 2001, the Planning Commission conducted a public workshop to identify large general issues of special interest to the community and to rank those concerns for treatment in the general plan. PMC distributed a list of 82 issues identified by City staff and asked the Commission to rank the relative importance of each one. PMC then computed the average rank that the Commissioners gave to each issue and used the results to construct a matrix of important topics to discuss in the general plan and how much weight to give each topic.
- PMC met with the City Council and Planning Commission in a general plan workshop on May 7, 2001, at which PMC presented to members of both bodies maps showing the existing land use designations for the entire City, and what the City would look like under several hypothetical build-out

scenarios. Members of the Council and Commission commented on the accuracy of the map of the existing City and provided general feedback about the visions represented by the others.

- On June 25, 2001, the City Council and Planning Commission met in a joint work session to consider land use alternatives prepared by PMC and provide guidance about the creation of a preferred land use alternative for environmental analysis.
- On July 9, 2001, the City Council and Planning Commission met in a joint work session to consider the continuation of agricultural land use designations in the general plan and the definition of such uses.
- On July 30, 2001, the City Council and Planning Commission held a joint special work session to continue their consideration of the land use alternatives prepared by PMC, including the definitions of land use designations and locations, so that they could decide upon a preferred alternative for the purpose of environmental analysis.
- On September 8, 2001, the City Council and Planning Commission met in a joint work session to continue discussions about land use alternatives, focusing particularly on agricultural, public and semi-public, business park, and utility district land uses. Members of the two bodies also discussed the format and appearance of the general plan. Finally, PMC distributed technical and background documents to the members of the Council and Commission for their review.
- On May 6, 2002, the City Council and Planning Commission held a joint work session to review the Draft General Plan Housing Element
- On September 7, 2002, the City Council and Planning Commission held a joint work session to review the Draft General Plan discussed below.

This public participation program informed the public of the on-going general plan process; obtained public input regarding major issues, community objectives, and plan policies; provided the public with opportunities to evaluate alternative plans and to participate in choosing the preferred alternative; informed decision makers of public opinions; and worked towards community consensus.

WHEREAS, various reports and documents also guided the preparation of an initial draft of the General Plan. A citywide land use inventory was prepared, updated traffic counts were assembled, and noise levels in different neighborhoods were monitored. Reports documenting local demographics, visual conditions, safety hazards, and natural resources were drafted. An Oakley 2020 General Plan Background Report was prepared; and

WHEREAS, the Draft General plan released to the public on September 13, 2002 consisted of the seven elements required by state law—Land Use, Transportation, Conservation, Open Space, Safety, Noise, and Housing—as well as two optional elements, Growth Management and Economic Development. The Draft General Plan contains goals, policies and programs to guide the physical development of the City and the conservation of its resources, generally over a 20-year planning horizon. Thus, the

Draft General Plan contains all content for the mandatory general plan elements as required by State law, including the proposed general distribution, location and extent of land uses in the Planning Area for residential, commercial, industrial, public, open space and parks and other categories of public and private uses of land, and including standards of population density and building intensity; and

WHEREAS, the City determined that an Environmental Impact Report ("EIR") should be prepared and circulated a Notice of Preparation dated March 25, 2002 to public agencies and interested parties for consultation on the scope of the EIR; and

WHEREAS, the City prepared a Draft EIR dated September 2002 (SCH No. 2002042134), which reflected the independent judgment of the City as to the potential environmental effects of the Project. The Draft EIR was circulated for the required 45 day public review period, from September 16, 2002 to October 30, 2002; and

WHEREAS, between September 16, 2002 and November 4, 2002, the Planning Commission held eight hearings on the General Plan and EIR, at which all interested parties were able to submit written and oral testimony. The Planning Commission recommended a number of changes to the Draft General Plan, which were summarized in a version dated November 12, 2002. Staff reviewed all recommended changes and determined that their qualitative and quantitative effect would not significantly change the Project. Thus, for instance, staff verified that the changes would not result in land use incompatibilities or inconsistencies with the General Plan; that local and cumulative impacts to circulation, biological resources, open space, public safety, and noise would not be changed significantly; and that the City would be able to meet its regional share of affordable housing; and

WHEREAS, the Planning Commission received oral comments from the public at a hearing held on October 29, 2002 regarding the Draft EIR and reviewed all written comments received prior to the close of the public comment period. Staff prepared a preliminary analysis of comments received, which was presented to the Planning Commission on November 18, 2002, at which time all interested parties had an opportunity to comment. Staff's good faith, reasoned preliminary analysis concluded that no new information was received that would require recirculation of the Draft EIR under CEQA Guideline 15088.5. Staff, however, indicated to the Commission that it would recommend that the Council make changes to the General Plan based on those comments and the responses contained in the Final EIR; and

WHEREAS, a staff report, dated November 18, 2002, described and analyzed for the Planning Commission the Draft EIR and staff's conclusions regarding the public comments and responses; and

WHEREAS, the Planning Commission reviewed the staff report and the Draft EIR on November 18, 2002, at which time all interested parties had the opportunity to be heard; and

WHEREAS, the Draft General Plan was reviewed in accordance with the provisions of the California Environmental Quality Act through the preparation and review of an Environmental Impact Report. On November 12, 2002, at the conclusion of a properly noticed public hearing, the Commission unanimously moved by voice vote to recommend that the City Council certify the Environmental Impact Report, and that the Council approve the version of the General Plan of the same date. On November 18, 2002, at the conclusion of a properly noticed public hearing, the Commission adopted Resolution No. 02-06, which recommended that the Council certify the Environmental Impact Report, including the changes identified as necessary in the staff report discussing the EIR. It also adopted Resolution No. 02-05, which recommended that the Council approve the November 12, 2002 version of the General Plan; and

WHEREAS, on November 12, 2002, the City Council held a properly noticed public hearing on the Land Use and Circulation Elements of the Draft General Plan, including the revisions recommended by the Planning Commission. The City Council made preliminary changes to the wording of the Land Use Element and to the Land Use Diagram, Figure 2-2. (The changes are summarized in Attachment 1.) Staff reviewed all recommended changes and determined that their qualitative and quantitative effect would not significantly change the Project, since, for instance, the population of the City at build-out would be slightly less than analyzed, and no land use incompatibilities would be introduced. Staff presented a red-lined version of the Land Use Element to the Council at its November 18, 2002 and December 3, 2002 hearings, and informed the Council of its conclusions; and

WHEREAS, on November 18, 2002, the City Council held a properly noticed public hearing on the Circulation and Health & Safety Elements, and continued the hearing on the Land Use Element. The City Council made preliminary changes to the wording of the Circulation and Health & Safety Elements. Staff reviewed all recommended changes and determined that their qualitative and quantitative effect would not significantly change the Project, since, for instance, the level of service standards for roadway segments and intersections would be adequate and achieved. The only change to the Health & Safety Element was the addition of a program. (The changes are summarized in Attachment 1.) Staff provided additional information regarding a few specific roadways at the Council's November 25 and December 2, 2002 hearings. Staff presented a red-lined version of the Circulation and Health & Safety Elements to the Council at its December 3, 2002 hearings, and informed the Council of its conclusions; and

WHEREAS, on November 19, 2002, the City Council held a properly noticed public hearing on the Housing and Noise Elements, and continued the hearing on the Land Use, Circulation, and Health & Safety Elements. The City Council made preliminary changes to the wording of the Housing and Noise Elements. (The changes are summarized in Attachment 1.) Staff reviewed all recommended changes and determined that their qualitative and quantitative effect would not significantly change the Project. With the changes, the Project would still result in the production of the City's share of the regional affordable housing allocation. Changes to the Noise

Element were not substantive; they merely clarified existing policies in the Draft General Plan. Staff presented a red-lined version of the Noise Element to the Council at its December 3, 2002 hearing. Staff presented a red-lined version of the Housing Element to the Council at its December 9, 2002 hearing and informed the Council of its conclusions regarding meeting affordable housing requirements; and

WHEREAS, on November 25, 2002, the City Council held a properly noticed public hearing on the Open Space & Conservation, Parks & Recreation, Growth Management, and Economic Development Elements, and continued the hearing on the Land Use, Circulation, Heath & Safety, Housing, and Noise Elements. The City Council made preliminary changes to the wording of the Growth Management, Open Space & Conservation, and Parks & Recreation Elements. (The changes are summarized in Attachment 1.) Staff reviewed all recommended changes and determined that their qualitative and quantitative effect would not significantly change the Project: the City would meet the requirements of Measure C, adequate open space would be preserved, and the identified parkland standard would be maintained. Staff presented a red-lined version of the Open Space & Conservation, Parks & Recreation, Growth Management, and Economic Development Elements to the Council at its December 3, 2002 hearing and informed the Council of its conclusions regarding the significance of the changes to the Project; and

WHEREAS, on December 2 and 3, 2002, the City Council held properly noticed public hearings to consider property owner special requests for land use designations in the General Plan. In response to some requests, the City Council made preliminary changes to the Land Use Diagram, Figure 2-2 in the General Plan. (The changes are summarized in Attachment 1.) Staff reviewed all recommended changes and determined that their qualitative and quantitative effect would not significantly change the Project, since, for instance, the population of the City at build-out would be slightly less than analyzed, no land use incompatibilities would be introduced, and the Project would meet the City's share of the regional affordable housing allocation; and

WHEREAS, comments from the Bay Area Air Quality Management District clarified that potential air emissions resulting from additional commutes and roadway congestion may possibly lead to a delay in attaining state and federal air quality standards. That impact would be significant and unavoidable. Approval of the 2020 General Plan must, therefore, include findings regarding alternatives, as set forth in Exhibit B, and must include a Statement of Overriding Considerations, which is attached as Exhibit C; and

WHEREAS, the Draft EIR identified several potentially significant impacts that will be reduced to insignificance with specified mitigation measures. Approval of the General Plan will therefore require adoption of mitigation findings, which are attached as Exhibit A; and

WHEREAS, on December 9, 2002, the City Council conducted a noticed public hearing on the Draft General Plan, as previously revised, at which time all interested parties had the opportunity to be heard. The City Council considered the Environmental Impact Report, the Planning Commission recommendations, and all written and oral testimony submitted at the public hearing. The Council then adopted a motion of intent by voice vote to certify the EIR and to approve the General Plan, and directed staff to prepare resolutions consistent with that intent; and

WHEREAS, on December 16, 2002, the City Council adopted Resolution No. 75-02, incorporated herein by reference, certifying the Environmental Impact Report as adequate and complete pursuant to the California Environmental Quality Act.

NOW, THEREFORE, BE IT RESOLVED THAT:

1. The foregoing recitals are true and correct and made a part of this resolution.

2. The City Council hereby finds that, with the changes outlined above, the General Plan is internally consistent and, as fully implemented, will provide for compatible land uses and a number of affordable housing units that satisfy the City's share of the regional allocation. The Council additionally finds that, the changes to the General Plan described above will not significantly change the Project: no new impacts have been introduced and all significant and potentially significant impacts previously reduced to a less than significant level by the full implementation of the General Plan will still be adequately mitigated. The Council, therefore, finds that the General Plan is in the public interest and does hereby approve the General Plan as set forth in the Draft General Plan dated November 12, 2002, with revisions to the General Plan text, as identified.

BE IT FURTHER RESOLVED THAT the City Council adopts the mitigation findings set forth in Exhibit A, the findings regarding alternatives to the Project set forth in Exhibit B, and the statement of overriding considerations set forth in Exhibit C.

ADOPTED this 16th day of December, 2002 by the following vote:

AYES:	Anderson, Nix, Rios, Huffaker, Vanek
NOES:	None
ABSENT:	None
ABSTENTIONS:	None

TVanek

MAYOR

ATTEST:

CITY CLERK

EXHIBIT A

EXHIBIT A

FINDINGS CONCERNING SIGNIFICANT IMPACTS AND MITIGATION MEASURES

Impact 3.1-B: *The proposed General Plan may induce growth and an increase in the number of housing units and jobs in the Planning Area.* DEIR p. 3-14.

Mitigation. Growth Management Element (GME) generally; Land Use Element (LUE) Policies 2.1.1, 2.1.3, 2.1.5, 2.1.9, 2.3.6, 2.3.11; LUE Programs 2.1.C, 2.2.A, 2.4.A; Circulation Element (CE) Policy 3.7.7; Housing Element (HE) Policies 10.1.1, 10.3.3; HE Programs 10.1.A, 10.1.B, 10.1.E.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. Although the General Plan calls for intensification of development relative to current conditions in the City, the policies and programs cited above assure that development will occur in conformity with the City's performance standards, and that, as a result, adequate public facilities and services will be provided to serve all expected growth.

Impact 3.1-C: *The proposed General Plan may result in land use conflicts and incompatibility between existing and proposed land uses.* DEIR p. 3-14.

Mitigation. Land Use Diagram, Figure 2-2 in the General Plan; LUE Policies 2.2.3, 2.2.7, 2.2.13, 2.3.7, 2.4.3; Open Space & Conservation Element (OSCE) Policies 6.1.2, 6.1.4; OSCE Program 6.6.A; Parks & Recreation Element (PRE) Policy 7.5.7; Noise Element (NE) Policies 9.1.1, 9.2.1.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The General Plan's Land Use Diagram shows that new development will generally be located adjacent to compatible land uses. Further, the policies and programs listed above provide for protection of existing residential and commercial development from new uses and intrusive traffic that could compromise the existing uses; buffers and transitions, including appropriately sized setbacks, landscaping, open space, and parks, to assure adequate distance between potentially incompatible uses; and noise standards that will diminish potential disturbances created by new development.

Impact 3.1-D: *The proposed General Plan may detract from the strength of Downtown Oakley as a focal point and destination within the City.* DEIR p. 3-18.

Mitigation. Land Use Diagram, Figure 2-2 in the General Plan; LUE Policies 2.2.6, 2.3.8, 2.3.12, 2.8.1, 2.8.2, 2.8.3, 2.8.4, 2.8.5, 2.8.9; LUE Programs 2.3.A, 2.3.B, 2.5.A, 2.8.B, 2.8.C; Economic Development Element (EDE) Programs 5.1.C, 5.1.L, 5.4.A; OSCE Policies 6.5.1, 6.5.4, 6.5.5, 6.5.6, PRE Program 7.4.E.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. Although the General Plan envisions and encourages economic development in other parts of the City, the policies and programs listed above show a special emphasis on preserving the Downtown area as a central location for pedestrian retail and dining, as well as the location of a civic center that will include City Hall. Moreover, the City Council has, by the adoption of Resolution No. 4-99, affirmed an Old Town Specific Plan adopted by the Contra Costa County Board of Supervisors by Resolution No. 97-337. That Specific Plan provides in more detail for the design standards and development of the area. Together, the foregoing will assure that the Downtown will remain a central location in the life of the City.

Impact 3.1-E: *The proposed General Plan may result in a cumulative impact on land use and development, regional population growth, and jobs/housing balance.* DEIR p. 20.

Mitigation. See Mitigation Measures for Impacts 3.1-B and 3.1-C.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The policies and programs listed for Impacts 3.1-B and 3.1-C will reduce individual impacts to a less than significant level, resulting in a less than cumulatively significant impact.

Impact 3.2-A: *Development associated with the proposed General Plan may impact scenic vistas and visual natural resources within the Planning Area.* DEIR p. 3-22.

Mitigation. LUE Policies 2.1.5, 2.1.6, 2.1.9, 2.6.1, 2.6.2, 2.6.3; LUE Program 2.4.B, 2.6.A; OSCE Policies 6.3.4, 6.3.5, 6.3.7, 6.6.1, 6.6.2, 6.6.3, 6.6.4, 6.7.1, 6.7.2; OSCE Programs 6.3.H, 6.6.B, 6.7.A, 6.7.B; PRE Policies 7.3.5, 7.4.3, 7.4.10, 7.4.11; PRE Programs 7.4.B, 7.4C.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The General Plan policies and programs listed above will assure that new development is designed, to the extent feasible, to preserve, restore and create open space and natural habitat. They additionally preserve public access to the Delta and other waterways in the City. Further, the policies and programs require new development to preserve, enhance, and take advantage of views of Mount Diablo. Thus, the General Plan will reduce visual impacts to a less than significant level.

Impact 3.2-B: *Development associated with the proposed General Plan may alter the existing visual character or quality and urban design of the Planning Area.* DEIR p. 24.

Mitigation. LUE Goals 2.1, 2.7, 2.8, 2.9; LUE Policies 2.1.3, 2.2.1, 2.2.2, 2.3.2, 2.5.1, 2.5.3, 2.5.5; LUE Programs 2.4.B, 2.5.A; EDE Policy 5.3.2; EDE Programs 5.3.B, 5.3.C, 5.3.E; OSCE Policies 6.5.1, 6.5.2, 6.5.4, 6.5.6; OSCE Program 6.5.B.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The General Plan's policies and programs call for the identification and preservation, to the extent feasible, of the City's historic resources, as well as the maintenance of the City's small town feel through the scale of buildings, landscaping, and trail construction. They further require the development and implementation of design standards for industrial and other uses. Finally, they require the development and implementation of a community preservation ordinance that will identify and eliminate blight. Together, those aspects of the General Plan will assure that the visual character and design of the Planning Area will be preserved and enhanced.

Impact 3.2-C: *Development associated with the proposed General Plan may change the City character.* DEIR p. 26.

Mitigation. See Mitigation Measures for Impact 3.2-B.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. Implementation of the policies and programs identified above will preserve and enhance the character of the City.

Impact 3.3-A: *New urban development associated with the proposed General Plan may result in increased traffic exceeding Level of Service (LOS) standards for roadway segments and signalized intersections.* DEIR p. 3-36.

Mitigation. CE Policies 3.1.1, 3.1.2, 3.1.7, 3.1.8; CE Programs 3.1.A, 3.1.B, 3.1.C, 3.1.D; GME Policies 4.1.1, 4.1.2.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The policies and programs identified above, in conjunction with the background studies for the General Plan and EIR, set forth Level of Service (LOS) standards for all roadway segments and intersections in the City that have been determined to be adequate to serve development at build-out of the General Plan. They further provide funding mechanisms to assure the construction of necessary facilities, including fee programs. Monitoring programs will assure that performance standards are being maintained.

Impact 3.3-B: *New urban development and intensification of use of developed areas in the Plan Area may result in increased needs for transit services not available through existing transit services and facilities.* DEIR p. 3-38.

Mitigation. CE Policies 3.3.1, 3.3.2, 3.3.3, 3.7.2; CE Programs 3.1.G, 3.3.A, 3.3.C, 3.3.D, 3.3.E, 3.3.F, 3.3.G, 3.7.B; OSCE Policy 6.6.2; OSCE Program 6.2.A; Housing Element (HE) Policy 10.1.2; HE Programs 10.1.G, 10.1.H.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The policies and programs identified above encourage and integrate into City planning the development of a transit-friendly circulation system. Roadways will be built to accommodate public transit. Residential and business development will be located to make travel by public transit a feasible alternative for the maximum number of residents possible, including placing high-density residential development and high density employment and retail uses near transit nodes. The City will coordinate with regional transportation authorities and transit providers to bring additional service to the City and to properly locate new facilities.

Impact 3.3-C: *New urban development associated with the proposed General Plan may create additional demand for pedestrian and bicycle connections and facilities.* DEIR p. 3-39.

Mitigation. LUE Policies 2.3.6, 2.3.9, 2.8.2, 2.8.3, 2.8.6, 2.8.9; LUE Program 2.8.D; CE Policies 3.2.1, 3.3.3, 3.2.3, 3.2.4, 3.7.2, 3.7.3; CE Programs 3.1.E, 3.1.G, 3.2.A, 3.2.B, 3.2.C, 3.2.D, 3.5.B, 3.7.B, 3.7.D, 3.7.G; OSCE Policy 6.2.2; OSCE Program 6.2.A; PRE Policies 7.3.8, 7.4.10, 7.5.6, 7.5.7, 7.5.10, 7.5.11, 7.5.12, 7.6.2.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The land use policies and programs listed above provide for the central location of neighborhood commercial centers within the areas they serve, a pedestrian downtown, sidewalks and bicycle lanes, and standards for pedestrian and bicycle facilities. The portions of the Circulation Element cited call for the incorporation of bicycles and pedestrian facilities in circulation plans, the creation of trail systems, funding for pavement maintenance, the creation of a Bicycle and Pedestrian Master Plan, and coordination with regional planning agencies. The other policies and programs listed reinforce and provide more details regarding the City's commitment to assure the presence of adequate pedestrian and bicycle facilities in Oakley as development under the General Plan occurs.

Impact 3.3-D: *New urban development associated with the proposed General Plan may result in a cumulative effect on traffic, transit, or pedestrian and bicycle facilities.* DEIR p. 3-43.

Mitigation. See Mitigation Measures for Impacts 3.3-A, 3.3-B, and 3.3-C.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The policies and programs listed for Impacts 3.3-A, 3.3-B, and 3.3-C will reduce individual impacts to a less than significant level, resulting in a less than cumulatively significant impact.

Impact 3.4-A: *New stationary and mobile sources of air pollutants cause by build-out of the proposed General Plan Land Use Map may cause emissions of ROG, NOx, and PM_{10}.* DEIR pp. 3-54 to 3-57.

Mitigation. LUE Policies 2.1.1, 2.2.5, 2.2.6, 2.3.3, 2.3.6, 2.3.11, 2.8.7, 2.8.8, 2.8..10; CE Policies 3.7.2, 3.7.6; CE Programs 3.7.D, 3.7.G; OSCE Policy 6.2.1, 6.2.3, 6.2.4, 6.2.5; OSCE Program 6.2.A, 6.2.C, 6.3.C; Health & Safety Element (HSE) Policies 8.3.1, 8.3.2, 8.3.3, 8.3.4, 8.3.5; Housing Element (HE) Policy 10.1.2; HE Program 10.1.G

Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. Even with the implementation of the policies and programs cited above, the impact will remain significant and unavoidable.

Impact 3.4-B: *Construction activities associated with development under the proposed General Plan may cause emissions of dust or contaminants from construction equipment exhaust that may substantially contribute to existing air quality violations or expose sensitive receptors to substantial pollutant concentrations.* DEIR p. 3-57.

Mitigation. LUE Policy 2.2.4; LUE Program 2.2.C; CE Policy 3.7.1; CE Program 3.7.A OSCE Policies 6.2.1, 6.2.3, 6.2.4; OSCE Programs 6.2.B, 6.2.C.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The policies and programs listed above include land use policies to separate and buffer adjacent uses to minimize construction impacts. They also call for the adoption of construction standards and the implementation of

BAAMQD's Air Quality Management Plan and dust control measures, as they relate to the General Plan.

Impact 3.4-C: *The population projections used in the proposed General Plan may be inconsistent with those of the 2000 Clean Air Plan.* DEIR p. 3-58.

Mitigation. See Mitigation Measures for Impacts 3.3-A, 3.3-B, 3.3-C, 3.3-D, and 3.4-A.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The policies and programs listed as Mitigation Measures for the Impacts identified above include all of the Transportation Control Measures (TCMs) of the Clean Air Plan (CAP) for which the City has partial or complete responsibility for implementation. The CAP was developed using population projections based on the City-adopted Contra Costa County General Plan. The Proposed Project would significantly reduce the ultimate population in the City from approximately 75,000 people to approximately 49,000 (68,000 in the entire Planning Area). Thus, although the population projections differ, the population of Oakley will be lower than expected by the CAP, and with the implementation of the TCMs through the General Plan, attainment of state-level ambient air quality standards will not be delayed.

Impact 3.4-E: *Implementation of the Proposed General Plan could result in placement of sensitive land uses near potential sources of objectionable odors, dust, or toxic air contaminants.* DEIR p. 3-61.

Mitigation. LUE Policies 2.2.3, 2.2.4, 2.2.5, 2.2.13; GME Policies 4.7.3, 4.7.4, 4.7.7; GME Program 4.7.E; OSCE Policies 6.1.2, 6.2.4; OSCE Program 6.1.C, 6.1.D, 6.6.A.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The land use, open space, and other policies and programs identified above demonstrate the City's intent to locate new uses that could produce such contaminants away from sensitive uses or to create buffers between the uses. Similarly, the policies and programs will result in new sensitive uses being constructed separate or buffered from existing uses that produce such contaminants.

Impact 3.4-F: *New stationary and movile sources of air pollutants caused by build-out of the proposed General Plan would cause emissions from ROG, Nox, and PM_{10} that would be cumulative considerable.* DEIR p. 3-63.

Mitigation. See Mitigation Measures for Impact 3.4-A.

Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. Even with the implementation of the policies and programs cited above, the impact will remain significant and unavoidable.

Impact 3.5-A: *New growth associated with the proposed General Plan may put increasing pressure on parks and recreational facilities, which may create demand for new and expanded recreational facilities and/or a shortage of park facilities accessible to all residents.* DEIR p. 3-70.

Mitigation. GME Policies 4.3.5, 4.6.9, 4.10.8; OSCE Policy 6.1.4; OSCE Programs 6.1.B, 6.2.A, 6.6.B; PRE generally.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The General Plan calls for the development and maintenance of a park system consisting of six acres of developed parkland for every 1,000 City residents. It further provides for funding mechanisms and other programs to implement that policy. Additionally, the General Plan identifies the Oakley Parks Master Plan, which is currently under development and will be adopted after the General Plan, more specifically identifying the means of providing adequate park facilities for the City's residents. The other policies and programs mentioned above are all designed to, and when implemented will, provide further support for the acheivement and maintenance of the City's parkland standard.

Impact 3.5-B: *Growth and development associated with the proposed General Plan may result in the loss of open space that may increase pressures to develop open space lands.* DEIR p. 72.

Mitigation. LUE Policies 2.1.5, 2.7.1; LUE Program 2.6.A; GME Policies 4.4.6, 4.7.8; OSCE Policies 6.1.4, 6.3.1, 6.3.2, 6.6.1, 6.6.4; OSCE Programs 6.1.B, 6.3.B, 6.6.A, 6.6.B, 6.6.C; PRE Policies 7.1.10, 7.1.11, 7.3.5, 7.3.6, 7.4.6; PRE Programs 7.1.A, 7.7.B.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. Oakley exists in an area designated for urban development by Contra Costa County before the City incorporated. Because Oakley is in an urbanizing area that previously supported agricultural operations of various sizes and types, some loss of open space is inevitable. The policies and programs identified above call for the preservation of open space within developments; the creation of a trail system; buffers between development and preserved open space; protection of ecological and biological resources; cooperative planning with regional, state, and federal authorities; the development and maintenance of an improved parkland system consistent with its parkland standard; and encouraging development and use of open space that will maintain its character. Additionally, a significant portion of the Cypress Corridor Special Planning Area is designation Delta Recreation in the General Plan, in recognition of a possible CALFED-funded program that would convert the property into a wetlands restoration and biological study area.

Impact 3.5-C: *The proposed General Plan may convert prime farmland, unique farmland, or farmland of statewide importance or conflict with existing zoning for agricultural use or a Williamson Act contract within the Planning Area.* DEIR p. 3-75.

Mitigation. LUE Policies 2.2.5, 2.2.13, 2.6.8; GME Policy 4.9.3; GME Program 4.9.E; OSCE Policies 6.1.1, 6.1.2, 6.1.3, 6.1.4; OSCE Programs 6.1.A, 6.1.B, 6.1.C, 6.1.D, 6.1.E, 6.1.F; PRE Policy 7.3.6; HE Policy 10.2.8; HE Programs 10.3.A, 10.3.B.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. Oakley exists in an area designated for urban development by Contra Costa County before the City incorporated. Because Oakley is in an urbanizing area that previously supported agricultural operations of various sizes and types, some loss of agricultural land is inevitable. The decision by property owners in the City to convert their previously agricultural land to other uses is not surprising given the decreasing financial sustainability of such operations in an urbanizing area; there is substantial evidence in the record that agricultural operations are becoming less economically feasible in the City. The policies and programs listed above call for the identification of properties that contain soils that would support agricultural uses, to be used in analyzing development applications; cooperation with other agencies to encourage water re-use programs; and the continued implementation of the City's Right to Farm Ordinance. Furthermore, planning policies require buffering existing agricultural property from new development with landscaping, trails, increased setbacks, and logical transitions in development density. The General Plan supports the development of housing for farm workers. Also, the Agriculture Limited designation will permit small commercial agricultural operations, and the Agriculture designation will protect existing larger operations in the Planning Area. Together, the foregoing policies and programs will preserve farmland in the City and Planning Area to the extent feasible.

Impact 3.6-A: *Growth and development associated with the proposed General Plan may strain government services and create demand for expanded services and facilities.* DEIR p. 3-81.

Mitigation. LUE Policies 2.1.2, 2.1.9, 2.2.10, 2.2.14, 2.3.13; LUE Programs 2.1.C, 2.1.D, 2.1.E, 2.4.C, 2.8.B; CE Policy 3.6.4; CE Programs 3.3.D, 3.5.D, 3.7.E; GME Policies 4.1.1, 4.1.2, 4.1.4, 4.2.1, 4.2.2, 4.2.3, 4.2.4, 4.2.5, 4.2.6, 4.2.7, 4.2.8, 4.2.9, 4.2.10, 4.2.11, 4.2.12, 4.3.1, 4.3.2, 4.3.3, 4.3.4, 4.3.5, 4.4.2, 4.5.4, 4.6.2, 4.6.3, 4.4.6, 4.6.5, 4.6.6, 4.6.7, 4.6.8, 4.6.10, 4.10.4; GME Programs 4.2.A, 4.2.B, 4.2.D, 4.3.B, 4.3.D, 4.4.F, 4.5.D, 4.6.A, 4.6.B, 4.6.F, 4.6.G, 4.9.A, 4.10.E, 4.10.F; OSCE Policy 6.5.B; PRE Policies 7.1.12, 7.1.19, 7.2.1; PRE Programs 7.1.A, 7.1.B, 7.1.D, 7.1.G, 7.1.H, 7.1.I, 7.1.O, 7.3.A, 7.4.A, 7.7.I, 7.7.J; HE Program 10.2.F, 10.2.G, 10.2.H, 10.2.I, 10.2.T, 10.5.E.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The above-listed policies and programs identify more specific plans, standards, programs, and funding mechanisms that will, together, assure that public facilities and services will be expanded adequately to meet the needs of the growth expected under the General Plan.

Impact 3.6-B: *Growth and development associated with the proposed General Plan may strain fire protection and emergency services and create demand for expanded services and facilities.* DEIR p. 3-89.

Mitigation. CE Program 3.5.F; GME Policies 4.4.1, 4.4.2, 4.4.3, 4.4.4, 4.4.5, 4.4.6; GME Programs 4.4.C, 4.4.D, 4.4.E, 4.4.F; Heath & Safety Element (HSE) Policies 8.4.4, 8.4.5; HSE Program 8.4.B.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The City receives fire protection services from the Oakley-Knightsen Fire Protection District, which estimates that current facilities in the area will be adequate to serve the Planning Area until 2004, when a new station will need to be completed. The City collects a fire facilities impact fee from new development on behalf of the District to fund necessary improvements. The policies and programs identified above call for the City to continue to require new development to contribute toward the expenses of increasing fire protection services. Further, they indicate the City's intent to work with the District to assure that its plans take the General Plan into account, and that the District has an opportunity to comment on new development to assure that it complies with fire safety control feature requirements.

Impact 3.6-C: *Growth and development associated with the proposed General Plan may strain law enforcement and create demand for expanded services and facilities.* DEIR p. 3-91.

Mitigation. LUE Policy 2.6.5; CE Policy 3.5.1; CE Program 3.5.F; GME Policies 4.5.1, 4.5.3, 4.5.4, 4.5.5, 4.5.7; GME Programs 4.5.A, 4.5.B, 4.5.C, 4.5.D.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The City contracts with Contra Costa County for police services. A tax originally imposed by the County, as well as fee programs, provide funding for the provision of police services. As the City grows, the policies and programs listed above will ensure adequate funding for expanded police services, as well as coordination between the police department and planning staff to assure that new development is designed and located to maximize the efficient provision of police protection.

Impact 3.6-D: *Growth and development associated with the proposed General Plan may strain schools and create demand for expanded services and facilities.* DEIR p. 3-93.

Mitigation. LUE Policy 2.2.9; CE Program 3.2.C; GME Policies 4.3.5, 4.6.1, 4.6.2, 4.6.3, 4.6.4, 4.6.5, 4.6.6, 4.6.7, 4.6.8, 4.6.9, 4.6.10, 4.6.10, 4.6.11, 4.6.12, 4.6.13; GME Programs 4.5.B, 4.6.A, 4.6.B, 4.6.C, 4.6.D, 4.6.E, 4.6.G, 4.6.G, 4.7.A; PRE Policies 7.1.10, 7.1.17, 7.6.3; PRE Programs 7.1.L, 7.1.N, 7.2.B, 7.6.A, 7.7.I.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. Oakley's elementary schools are currently over capacity, and the middle schools are operating and 90 percent of their capacity. The City does not have direct responsibility for the provision of schools, but affect school population size through land use planning. The policies and programs listed above provide that, to the extent feasible, the City will work with the school districts to assure that new development adequately provides for new schools and to coordinate planning the location of future school sites; they also call for cooperation between the City and school districts to obtain altemative funding. They further provide for the City to locate compatible uses adjacent to future and existing school sites, as well as to plan compatible alterations to the City's circulation system. The City will also attempt to work with the districts to prepare a school facilities plan.

Impact 3.6-E: *Growth and development associated with the proposed General Plan may strain solid waste and recycling services and create demand for expanded services and facilities.* DEIR p. 3-96.

Mitigation. GME Policies 4.7.2, 4.7.3, 4.7.4, 4.7.5, 4.7.6, 4.7.7, 4.7.8, 4.7.9; GME Programs 4.7.A, 4.7.B, 4.7.C, 4.7.D, 4.7.E, 4.7.F.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The City does not control solid waste disposal and recycling in its jurisdiction. Nevertheless, the expected growth under the General Plan will add to the solid waste disposal and recycling needs of the City. The solid waste disposal and recycling provider for the City has indicated that the necessary expansion of its services will be adequately financed by fees, and that the disposal facility has adequate capacity for the build-out period. The policies and programs listed above will ensure that the City's planning, to the extent feasible, minimizes solid waste generation and encourages recycling.

Impact 3.6-F: *New urban development associated with the proposed General Plan may result in a cumulative effect on public services.* DEIR p. 3-98.

Mitigation. See Mitigation Measures for Impacts 3.6-A through 3.6-E.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The policies and programs listed for Impacts 3.6-A through 3.6-E will reduce individual impacts on public services to a less than significant level, resulting in a less than cumulatively significant impact.

Impact 3.7-A: *Development in accordance associated with the proposed General Plan may result in changes in absorption rates, drainage patterns, and the rate and amount of surface runoff within the Planning Area. This could expose people or property to water related hazards such as flooding.* DEIR p. 105.

Mitigation. LUE Policies 2.6.2, 2.6.3, 2.6.4; GME Policies 4.10.1, through 4.10.9; GME Programs 4.10.A through 4.10.H; OSCE Policy 6.3.3; OSCE Program 6.3.G; PRE Program 7.1.L; HSE Policies 8.2.1 through 8.2.13; HSE Programs 8.2.A through 8.2.G.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The policies and programs identified above will result in the development, implementation, and maintenance of an adequate storm drainage system, in coordination with and based in part on the plans of the Contra Costa County Flood Control and Water Conservation District (CFCWCD).

Impact 3.7-B: *New development associated with the proposed General Plan may increase fire hazard in areas with flammable brush, grass, or trees.* DEIR p. 3-109.

Mitigation. LUE Policy 2.6.5; CE Program 3.5.F; GME Policies 4.4.1 through 4.4.6; GME Programs 4.4.A through 4.4.G; PRE Policy 7.5.10; HSE Policies 8.4.1 through 8.4.5; HSE Programs 8.4.A through 8.4.C.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The policies and program identified above will result, to the extent that doing so is within the jurisdiction of the City, in the provision of an efficient and rapid fire-response system.

Impact 3.7-D: *Development associated with the proposed General Plan may locate new industrial uses that involve hazardous material and wastes close to existing or proposed sensitive receptors.* DEIR p.3-112.

Mitigation. LUE Policies 2.2.3, 2.2.4, 2.2.13, 2.4.1, 2.4.3; GME 4.4.5, 4.7.7, 4.7.10; GME Program 4.7.E; HSE Policies 8.3.1 through 8.3.5; HSE Programs 8.3.A, 8.3.B.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The General Plan eliminates heavy industrial uses from the possible land uses in the City, although light industrial uses are allowed, primarily in the northwest area of Oakley. Additionally, in the Northwest Oakley Special Planning Area, a potential energy production use would be allowed. The policies and program identified above assure that sensitive uses, such as residential development, will be located away from such uses to the extent possible. When sensitive uses cannot be prevented from being located adjacent to industrial uses, the policies and programs call for design buffers, increased setbacks, and regular monitoring of toxic substances to assure public safety.

Impact 3.7-E: *Development associated with the proposed General Plan in combination with other growth in east Contra Costa County may lead to potential cumulative impacts to health and safety.* DEIR p. 3-116

Mitigation. See Mitigation Measures for Impacts 3.7-A through 3.7-E.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The policies and programs listed for Impacts 3.7-A through 3.7-E will reduce individual impacts on public health and safety to a less than significant level, resulting in a less than cumulatively significant impact.

Impact 3.8-A: *Future development associated with the proposed General Plan may result in additional discharge into surface waters or other alteration of surface water quality in violation of Regional Water Quality Control Board standards or waste discharge requirements.* DEIR p. 3-122.

Mitigation. GME Policy 4.10.2; GM Programs 4.8.B, 4.8.C.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The implementation of the policy and programs listed above, and consultation with the Contra Costa Water District regarding development in proximity to the Contra Costa Canal, will adequately protect surface water quality.

Impact 3.8-B: *New development associated with the proposed General Plan may result in a substantial increase of construction-related erosion and sedimentation into surface waters.* DEIR p. 3-125.

Mitigation. GME Program 4.10.B; OSCE Policy 6.6.2; OSCE Program 6.2.B.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The implementation of the policies and programs listed above call for participating in the NPDES program and implementing the BAAQMD's dust control measures, thereby limiting, to the extent feasible, erosion and sedimentation into surface water.

Impact 3.8-C: *New development under the proposed General Plan may generate wastewater flows that exceed the collection and treatment capacity of the existing wastewater treatment plant.* DEIR p. 3-127.

Mitigation. GME Policies 4.8.10, 4.8.13, 4.9.1, 4.9.2, 4.9.3, 4.9.4; GME Programs 4.9.A through 4.9.E; PRE Program 7.1.P.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. Build-out under the General Plan will result in increased discharge of treated effluent, which could have potential water quality impacts. The City does not provide effluent treatment, but the agency responsible for that service within the Planning Area has assured the City that it has adequate capacity to serve the Planning Area through build-out. The policies and programs listed above ensure that the City's planning for future development is coordinated with the effluent treatment provider for the area, that opportunities for using reclaimed wastewater are maximized, and that new development demonstrates that adequate treatment capacity exists.

Impact 3.9-A: *Approval of projects under the General Plan may reduce or destroy the habitat of species identified as sensitive, including species identified as endangered, candidate, and/or special status by the California Department of Fish and Game and U.S. Fish and Wildlife Service.* DEIR p. 3-137.

Mitigation. LUE Policies 2.1.5, 2.6.6, 2.6.7; LUE Program 2.6.A; GME Policy 4.10.6; GME Program 4.10.H; OSCE Policies 6.3.1 through 6.3.7, 6.6.1 through 6.6.4; OSCE Programs 6.3.A through 6.3.H, 6.6.C; PRE Policies 7.2.7, 7.3.7, 7.3.10, 7.4.6, 7.4.7.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The policies and programs listed above contain land use directives to preserve open space generally; to preserve ecological and biological resources as open space; to reduce the impact of development on such resources, as identified in the planning process; to preserve important wildlife habitat; to buffer open space from development and create coherent open space systems; to require surveys for important plant and animal species prior to development; to coordinate with other public agencies; to design parks to preserve natural features; and to revise the Municipal Code to implement those policies. Together, those policies and programs will reduce the identified impact to a less than significant level.

Impact 3.9-B: *Implementation of the proposed General Plan may result in loss of plant and wildlife habitat within the Planning Area.* DEIR p. 3-140.

Mitigation. See Mitigation Measures for Impact 3.9-A.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The policies and programs listed above contain land use directives to preserve open space generally; to preserve ecological and biological resources as open space; to reduce the impact of development on such resources, as identified in the planning process; to preserve important wildlife habitat; to buffer open space from development and create coherent open space systems; to require surveys for important plant and animal species prior to development; to coordinate with other public agencies; to design parks to preserve natural features; and to revise the Municipal Code to implement those policies. Together, those policies and programs will reduce the identified impact to a less than significant level.

Impact 3.9-C: *Approval of projects under the updated General Plan may adversely affect movement and dispersal of wildlife and wildlife migration corridors.* DEIR p. 3-140.

Mitigation. See Mitigation Measures for Impact 3.9-A.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The policies and programs listed above contain land use directives to preserve open space generally; to preserve ecological and biological resources as open space; to reduce the impact of development on such resources, as identified in the planning process; to preserve important wildlife habitat; to buffer open space from development and create coherent open space systems; to require surveys for important plant and animal species prior to development; to coordinate with other public agencies; to design parks to preserve natural features; and to revise the Municipal Code to implement those policies. Together, those policies and programs will reduce the identified impact to a less than significant level.

Impact 3.9-D: *New development under the General Plan may result in the introduction and spread of non-native invasive plant species.* DEIR p. 3.141.

Mitigation. See Mitigation Measures for Impact 3.9-A.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The policies and programs listed above contain land use directives to preserve open space generally; to preserve ecological and biological resources as open space; to reduce the impact of development on such resources, as identified in the planning process; to preserve important wildlife habitat; to buffer open space from development and create coherent open space systems; to require surveys for important plant and animal species prior to development; to coordinate with other public agencies; to design parks to preserve natural features; and to revise the Municipal Code to implement those policies. Together, those policies and programs will reduce the identified impact to a less than significant level.

Impact 3.9-E: *Development associated with the proposed General Plan may result in a significant loss of trees.* DEIR p. 3-141.

Mitigation. OSCE Policy 6.3.5; OSCE Programs 6.3.C, 6.3.D.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The policy and programs listed above call for the preservation of trees in the Planning Area; the appropriate implementation of a tree-planting program; and the appropriate revision, maintenance, and enforcement of the City's Heritage Tree Ordinance.

Impact 3.9-F: *Development associated with the proposed General Plan may lead to the cumulative conversion and loss of plant and animal habitat.* DEIR p. 3-142.

Mitigation. See Mitigation Measures for Impact 3.9-A through 3.9-E.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The policies and programs listed for Impacts 3.9-A through 3.9-E will reduce individual impacts on plant and animal habitat to a less than significant level, resulting in a less than cumulatively significant impact.

Impact 3.10-B: *Development associated with the proposed General Plan could damage unknown historic, cultural, prehistoric, or archaeological resources in the Planning Area.* DEIR p. 3-148.

Mitigation. LUE Policies 2.5.1 through 2.5.5, 2.8.4, 2.8.11; LUE Programs 2.5.A, 2.5.B; OSCE Policies 6.4.1, 6.5.1 through 6.5.6; OSCE Programs 6.4.A, 6.5.A through 6.5.C.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The policies and programs listed above call for reviewing development applications to ensure preservation of historic structures; reducing some development requirements for projects that re-use historic strcutures; preserving historic resources in the Downtown area as it develops; supporting programs to obtain funding for inventorying and renovating historic resources; locating compatible uses adjacent to historic structures; requiring development to handle archaeological and paleontological discoveries in compliance with state and federal law; using historical resources as a tool to attract development; and encouraging the registration of historical properties. Together those policies and programs will, to the extent feasible, preserve historic, cultural, prehistoric, and archaeological resources.

Impact 3.10-C: *Development associated with the proposed General Plan in combination with growth elsewhere in eastern Contra Costa County and the western San Joaquin Valley could result in cumulative loss to cultural resources.* DEIR p. 3-151.

Mitigation. See Mitigation Measures for Impact 3.10-B.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. Implementation of the policies and programs discussed in Impact 3.10-B will reduce all individual impacts on cultural resources to a less than significant level, resulting in a less than cumulatively significant impact.

Impact 3.11-A: *New development under the proposed General Plan will increase the demand for public water and may exceed available supply (during drought years) or distribution capacity.* DEIR p. 3-154.

Mitigation. GME Policies 4.7.5, 4.8.1 through 4.8.13, 4.10.2; GME Programs 4.8-A through 4.8-E; PRE Program 7.1.P.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The City does not provide water service, but its land use planning will affect water demand. The agency that provides water in Oakley has assured the City that it will have adequate supply to serve the Planning Area through build-out of the General Plan. The policies and programs identified above call for the City to work with the water-providing agency to assure adequate water supply; to require new development to demonstrate that adequate water will be available for the project; to encourage water conservation and re-use, to the extent feasible; and to monitor land uses that could result in contamination of groundwater supplies.

Impact 3.11-B: *New development associated with the proposed General Plan may result in exceeding utility service capabilities during peak periods.* DEIR p. 3-157.

Mitigation. GME Policies 4.7.1, 4.7.6; OSCE Policy 6.2.1; HE Policy 10.2.7; HE Programs 10.2.C, 10.2.O, 10.4.B.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The City does not directly provide utility services, but its land use planning will affect demand for such services. The policies and programs listed above call for the City to work with PG&E to monitor transmission facilities and demand and, as required by CEQA, to avoid or reduce inefficient, wasteful, and unnecessary consumption of energy. They further require the development of programs to include energy efficiency tools in new development.

Impact 3.12-A: *Development associated with the proposed General Plan may place buildings on expansive soils, thus potentially causing structural damage or exposing people or structures to potential seismic events and related ground shaking.* DEIR p. 3-167.

Mitigation. HSE Policies 8.1.1 through 8.1.7, 8.1.18, 8.1.19, 8.2.13, 8.4.4; HSE Programs 8.1.A through 8.1.D.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The policies and programs identified require that structures, particularly for human occupancy, constructed in areas where there is a high risk of severe damage in the event of an earthquake be designed to perform satisfactorily under earthquake conditions, including liquefaction. Further, they prohibit construction of critical structures and facilities in such areas, if the loss of the structures or facilities would substantially affect the public safety or provision of needed services. Finally, they require adherence to state building codes in design and construction, the provision of adequate setbacks relative to the location, and all necessary studies as part of the environmental review process for individual development projects.

Impact 3.12-B: *Development associated with the proposed General Plan may locate people and structures in areas with potential for liquefaction.* DEIR p. 3-168.

Mitigation. See Mitigation Measures for Impact 3.12-A.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The policies and programs identified require that structures, particularly for human occupancy, constructed in areas where there is a high risk of severe damage in the event of an earthquake be designed to perform satisfactorily under earthquake conditions, including liquefaction. Further, they prohibit construction of critical structures and facilities in such areas, if the loss of the structures or facilities would substantially affect the public safety or provision of needed services. Finally, they require adherence to state building codes in design and construction, the provision of adequate setbacks relative to the location, and all necessary studies as part of the environmental review process for individual development projects.

Impact 3.12-C: *Redevelopment of sites along the Delta waterfront may subject greater population to liquefaction, tsunami, and other seismic hazards.* DEIR p. 3-169.

Mitigation. See Mitigation Measures for Impact 3.12-A.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The policies and programs identified require that structures, particularly for human occupancy, constructed in areas where there is a high risk of severe damage in the event of an earthquake be designed to perform satisfactorily under earthquake conditions, including liquefaction. Further, they prohibit construction of critical structures and facilities in such areas, if the loss of the structures or facilities would substantially affect the public safety or provision of needed services. Finally, they require adherence to state building codes in design and construction, the provision of adequate setbacks relative to the location, and all necessary studies as part of the environmental review process for individual development projects.

Impact 3.13-A: *New development may increase traffic volumes along existing roadways and introduce traffic along new roadways, thereby exposing residents to excessive roadside noise levels.* DEIR p. 3-175

Mitigation. CE Policy 3.7.1; CE Program 3.7.A; GME Program 4.3.C; Noise Element (NE) Policies 9.1.1, 9.1.5, 9.1.6, 9.1.7, 9.2.1; NE Program 9.1.A.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The policies and programs cited above, among other things, require the City, through site planning and design review for new projects, to assure that the noise standards set forth in the Noise Element are met with regard to transportation-related noise. When those measures cannot achieve compliance with the noise standards, the City will require the implementation of noise barriers. Additionally, the City will update its Noise Ordinance, as necessary, to protect existing development from excessive noise, consistent with the standards in the Noise Element. Moreover, pursuant to the policies and programs, the City will work with other agencies responsible for roadway construction to assure compliance with local noise standards.

Impact 3.13-B: *The General Plan may potentially expose existing noise-sensitive uses to construction-related noise, and excessive levels of ground borne vibration and noise. Ambient noise levels near areas of new development may temporarily increase.* DEIR p. 3.13-B.

Mitigation. CE Policy 3.7.1; CE Program 3.7.A; NE Policies 9.1.2, 9.1.4; NE Program 9.1.A.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The policies and programs cite above disallow new development that does not comply with the standards set forth in the Noise Element for non-transportation noise sources, including construction, unless effective noise mitigation measures are implemented as part of the project. When non-residential development, including related construction activities, is likely to exceed noise standards, an acoustical analysis must be performed so that noise mitigation can be included in project design. Updates to the City's Noise Ordinance will include regulation of construction-related noise. The City will work with other public agencies responsible for construction projects to assure compliance with local noise standards.

Impact 3.13-C: *Implementation of the proposed Land Use Map would have the potential of locating noise generating, non-traffic sources close to sensitive land uses.* DEIR p. 3-179.

Mitigation. LUE Policies 2.1.8, 2.2.4, 2.4.1, 2.4.3; LUE Program 2.4.B; GME Program 4.3.C; NE Policies 9.1.1, 9.1.2, 9.1.3, 9.1.4, 9.1.7, 9.1.8, 9.1.9, 9.2.1, 9.2.2; NE Program 9.1.A.

Finding. Changes have been required in, or incorporated into, the Project that avoid or substantially lessen the significant effect identified in the EIR.

Rationale for Finding. The EIR assumes full implementation of the General Plan, including all policies and programs. The policies and programs cited require noise mitigation measures that result in compliance with the standards set forth in the Noise Element when new development proposes to locate new noise-sensitive uses adjacent to existing noise-producing uses. Similarly, they require that new noise-producing uses proposed to be located adjacent to noise-sensitive uses implement noise mitigation measures. Additionally, the land use planning for the City, as shown in Figure 2-2 of the General Plan, generally separates noise-sensitive uses from noise-producing uses in areas susceptible to future development. Finally, the updates to the Noise Ordinance will more fully address the details of assuring that new development does not create excessive noise close to sensitive land uses.

EXHIBIT B

EXHIBIT B

FINDINGS REGARDING ALTERNATIVES

The Oakley 2020 General Plan Environmental Impact Report identified three alternatives: No Project, High Density, and Low Density. The City Council found the No Project, High Density, and Low Density Alternatives infeasible and approved the Proposed Project with identified modifications. These findings are for the High Density, Low Density, and No Project Alternatives. The alternatives analysis is presented in Chapter 4.0 of the DEIR.

The City Council hereby finds that the three alternatives identified and described in the EIR were considered and finds them to be infeasible for the specific economic, social, or other considerations set forth below pursuant to CEQA section 21081(c). In making those findings, the City considered the goals of the Project, as set out on pages ES-1 to ES-2 of the DEIR, as well as the goals listed on page 1-2 of the General Plan.

HIGH DENSITY ALTERNATIVE. DEIR Pages 4-2 to 4-3, 4-5 to 4-22.

Finding: Infeasible. This alternative would result in the greatest number of residential housing units and the largest population. It would not, however, result in the creation of more non-residential development. Additionally, it would produce the least amount of open space and parkland.

All of the unavoidable impacts for the Project would remain. Therefore, there is no substantial benefit from adopting this alternative given the other benefits from the Project.

This alternative would not improve the ratio of jobs to residents in the City; although it would produce approximately as many jobs as the Project, the significantly larger population would mean that the City would still have an imbalance. This alternative does not adequately provide for a functioning and vital downtown. It does not preserve the small town feel of Oakley. It would put the greatest stress on the City's infrastructure. It does not preserve adequate open space. It does not focus recreational development on the Delta. It would allow significant development in flood-prone areas. It provides no focused preservation of the City's historical resources.

In sum, the Council finds that the alternative does not offer significant benefits compared to the Project and does not achieve many of the Project's goals.

LOW DENSITY ALTERNATIVE. DEIR Pages 4-3 to 4-4, 4-5 to 4-22.

Finding: Infeasible. This alternative would result in the fewest number of new residential units and the least amount of non-residential development. In particular, it eliminates the business park and utility energy uses in the northwest of the City in favor of expanded light industrial uses.

All of the unavoidable impacts for the Project would remain. Therefore, there is no substantial benefit from adopting this alternative given the other benefits from the Project.

This alternative would not improve the ratio of jobs to residents in the City; although it would produce a lower overall population in fewer dwelling units, it would not produce as many employment opportunities for the City's residents. Thus, the City would still have an imbalance. This alternative does not adequately provide for a functioning and vital downtown. It does not encourage significant economic development. It creates uncertainty about the City's ability to meet is state-mandated affordable housing requirements. Commercial nodes would be primarily low density and would, therefore, not encourage the development or use of transit. It would still result in increased stress on the City's infrastructure, but the lower development would diminish financing for the necessary improvements and increase the time before they could be provided.

The Council concludes that, although it offers some benefits by increasing open space and decreasing population density, the benefits of the alternative are not significant, and that it fails to achieve many of the goals of the Project.

<u>NO PROJECT ALTERNATIVE</u>. DEIR Pages 4-4 to 4-5, 4-5 to 4-22.

<u>Finding: Infeasible</u>. This alternative assumes no new General Plan will be adopted. As a result, the City-adopted County General Plan would remain in effect. It would result in a larger population than the Project in more residential units. It would also retain heavy industrial and agricultural land uses; the latter are located adjacent to urbanizing areas. The alternative proposes less commercial development, eliminates the business park designations, and contains no focused planning for the downtown.

All of the unavoidable impacts for the Project would remain. Therefore, there is no substantial benefit from adopting this alternative given the other benefits from the Project.

This alternative would not improve the ratio of jobs to residents in the City; it would result in a larger population than the Project but would produce significantly less commercial and other employment-generating non-residential development. This alternative does not adequately provide for a functioning and vital downtown. It does not encourage significant economic development. It does not focus recreational development adjacent to the Delta. It will not attract and retain business.

The Council finds that the alternative does not offer significant benefits compared to the Project and does not achieve many of the Project's goals.

EXHIBIT C

EXHIBIT C

STATEMENT OF OVERRIDING CONSIDERATIONS

1. **General.** Pursuant to CEQA Guidelines section 15093, the City Council of the City of Oakley makes this Statement of Overriding Considerations for those impacts identified in the Oakley 2020 General Plan EIR as significant and unavoidable. The City Council has carefully considered each impact in reaching its decision to approve the Project. Although the City Council believes that many of the unavoidable environmental effects identified in the EIR will be substantially lessened by mitigation measures incorporated into the Project, and by future development plans as well as future mitigation measures implemented with future approvals, it recognizes that the implementation of the Project carries with it unavoidable adverse environmental effects.

The City Council specifically finds that to the extent that the identified adverse or potentially adverse impacts have not been mitigated to acceptable levels, there are specific economic, social, environmental, land use, and other considerations that support approval of the Project.

2. **Unavoidable Significant Adverse Impacts.** The following unavoidable significant environmental impacts are associated with the Oakley 2020 General Plan as identified in the EIR. The impacts cannot be fully mitigated by changes or alterations to the Project.

Impact 3.4-A: ***New stationary and mobile sources of air pollutants cause by build-out of the proposed General Plan Land Use Map may cause emissions of ROG, NOx, and PM$_{10}$.*** **DEIR pp. 3-54 to 3-57, FEIR pp. 4-10 to 4-12.** The General Plan contains a number of goals, policies, and programs designed to mitigate to the fullest extent possible the identified impacts on air quality. The EIR assumes full implementation of the General Plan. The Project is consistent with BAAQMD policies encouraging compact, infill development near public transit and includes variants of all of the strategies suggested by BAAQMD to minimize regional air quality impacts through accessibility to non-automobile forms of transportation. However, even with its transit and pedestrian oriented design, in part because the City is in an area of non-attainment for several air pollutants, the Project would exceed BAAQMD regional air quality standards and no feasible mitigation measures are identified to further reduce this impact; therefore Project impacts remain significant and unavoidable.

Impact 3.4-F: ***New stationary and movile sources of air pollutants caused by build-out of the proposed General Plan would cause emissions from ROG, Nox, and PM$_{10}$ that would be cumulative considerable.*** **DEIR p. 3-63, FEIR p. 4-12.** See discussion for Impact 3.4-A.

3. **Overriding Considerations.** The City Council has balanced the benefits of the Oakley 2020 General Plan to the City of Oakley against the significant and potentially significant adverse impacts identified in the EIR that have not been eliminated or

mitigated to a level of insignificance. To the extent that the Project would result in unavoidable significant impacts described in the EIR, the City Council hereby determines that such unavoidable impacts are outweighed by the benefits of Project as further set forth below. The City Council, acting pursuant to CEQA Guidelines Section 15093, hereby determines that unavoidable impacts of the Project are outweighed by the substantial public benefits of the Oakley 2020 General Plan. Approval of the Project satisfies the City's goals for a general plan: allowing development while preserving a small town feel; ensuring attractive development; ensuring adequate infrastructure to serve new development; ensuring an adequate multi-modal circulation system; encouraging economic growth while providing adequate housing for all economic segments balancing jobs and housing; ensuring open space buffers between the City and adjacent jurisdictions; retaining open space and encouraging recreational development on the Delta; protecting residents from noise and hazards; developing a functioning and vital downtown; and attracting and retaining businesses. The Project's land uses provide for additional housing for all economic segments, a variety of non-residential uses, diverse business opportunities, properly located parks and open space, and an appropriately designed circulation to provide transportation alternatives to the community. The mix of uses will create a vibrant suburban community that offers its residents and the region high quality opportunities to live, work, and play. Properly located higher density housing will encourage transit use as well as increase the potential for affordable housing. The urban densities will be further complemented by recreational opportunities. Approval of the Project advances City policies to provide comprehensive community planning that balances various land uses and encourages diversity of housing opportunities, economic development, open space and parkland, increased employment, and transit facilities. In addition, the Project will result in the following substantial public benefits.

<u>Economic Considerations</u>. Substantial evidence is included in the record demonstrating the economic benefits that the City would derive from implementation of the Project. Specifically, the Project will result in:

a. As many as 34,000 new jobs, as well as a substantial number of construction jobs.

b. Potential commercial development that will result in increases in sales tax revenues for the City.

c. Substantial increases in property tax revenues.

<u>Social Considerations</u>. Substantial evidence exists in the record demonstrating the social benefits that the City would derive from the implementation of the Project. Specifically, the Project will result in:

a. Increases in housing opportunities in the City and in a region that has experienced increasingly intense housing demand in the last 10 years.

b. Increases in the amount of affordable housing in the community.

c. Increased opportunities for the City to contribute its fair share of regional housing.

d. Provision of higher density housing opportunities near local and regional public transit facilities.

Appendix J

Water Supply Assessment

DIABLO
WATER
DISTRICT

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Directors:
John H. deFremery
President
Howard Hobbs
Vice President
Kenneth L. Crockett
Edward Garcia
Richard Head

General Manager
& Secretary:
Mike Yeraka

General Counsel
Jeffrey D. Polisner

June 1, 2007

RECEIVED
JUN 04 2007
CITY OF OAKLEY

Ms. Rebecca Willis
Community Development Director
City of Oakley
3231 Main Street
Oakley, CA 94561

Subject: Water Supply Assessment for the Cline Property Specific Plan Project

Dear Ms. Willis:

Enclosed is Diablo Water District's Resolution No. 2007-5, Adopting the Water Supply Assessment for the Cline Property Specific Plan Project.

Sincerely,

Mike Yeraka /LL

Mike Yeraka
General Manager

MY:ll

Enclosures

RESOLUTION NO. 2007-5

RESOLUTION OF THE BOARD OF DIRECTORS OF DIABLO WATER DISTRICT ADOPTING THE WATER SUPPLY ASSESSMENT FOR THE CLINE PROPERTY SPECIFIC PLAN PROJECT

WHEREAS, pursuant to California Water Code Sections 10910 – 10915, the City of Oakley has requested that Diablo Water District (DWD) prepare a Water Supply Assessment for the Cline Property Specific Plan Project (Project); and

WHEREAS, the Project is a proposed 76.4-acre development including approximately 630,000 to 770,000 square feet of hotel, restaurant and retail space, all of which is within the territory of DWD and Contra Costa Water District (CCWD); and

WHEREAS, DWD operates a public water system as defined by Section 10912 (c) of the California Water Code with more than 9,800 service connections; and

WHEREAS, DWD has adopted and updated an Urban Water Management Plan, which applies to the Project.

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of Diablo Water District that the Water Supply Assessment for the Project dated April 30, 2007, and marked as Exhibit A attached hereto and made a part hereof is approved and adopted; and

BE IT FURTHER RESOLVED that the General Manager is authorized and directed to file a certified copy of this Resolution and Water Supply Assessment with the City of Oakley.

* * * * *

The foregoing Resolution was duly and regularly adopted at a meeting held on this 23rd day of May 2007 by the Board of Directors of Diablo Water District by the following vote of the Board:

AYES: Crockett, de Fremery, Garcia, Head, and Hobbs
NOES: none
ABSENT: none

Dated: May 31, 2007

Mike Yeraka, Secretary

EXHIBIT A

Senate Bill 610 WATER SUPPLY ASSESSMENT
for the
CLINE PROPERTY SPECIFIC PLAN PROJECT

by the
DIABLO WATER DISTRICT

Purpose of Report

The Diablo Water District (DWD or District) pursuant to the requirements of California Water Code §§ 10910 – 10915 prepared this Water Supply Assessment (WSA) Report for the Cline Property Project (Project).

As set forth in Senate Bill 610 (SB610), this WSA examines existing water supply entitlements, water rights, and water service contracts relevant to the water supply for the proposed Project and water received in prior years pursuant to those entitlements.

The proposed Project has been identified by the limits set forth in Sections 10910 and 10912 of the California Water Code and is subject to the California Environmental Quality Act (CEQA) (Division 13 of the Public Resources Code) under Section 21080 of the Public Resources Code establishing the need for this Water Supply Assessment.

Project Description

According to the City of Oakley (City), the Project consists of proposed development of a 76.4-acre site located to the north of Main Street, east of Bridgehead Road, and south of the BNSF Railroad right-of-way, within the City limits (Figure 1). The proposed Project site will contain four principal buildings for major retail uses, including, a large format discount store of up to 120,000 square-feet, a discount super center of up to 230,000 square-feet, and a home improvement superstore of up to 170,000 square-feet. The square footage of these three areas may accommodate a fourth major retail use. Secondary retail and service uses include shops, restaurants up to 220,000 square-feet, and an optional hotel use accommodating up to 100 rooms or approximately up to 40,000 square-feet, for a total of up to 260,000 square–feet of secondary retail service. The approved building square footage, including major retail, secondary retail, and hotel, is a maximum of 770,000 square-feet, with an overall floor to area ratio (FAR) of approximately 0.23 (Figure 2 and Figure 3). The City has developed two Alternative Development and Land Use Plans, the first labeled Plan A, and the second labeled Plan B. Both Plan A and Plan B would consist of a total of 690,000 square-feet of Total Floor Area, and contain the same amount of square-feet for hotel, restaurant, and retail use. The City also proposes a Higher Intensity Plan, called Alternative 1, and a Lower Intensity Plan, called Alternative 2. Alternative 1 has a total maximum square footage of 770,000 and Alternative 2 has a total maximum square footage of 630,000.

The proposed Project provides for a range of features, including public plazas and water-features.

Figure 1: Cline Property Regional Location
Source: City of Oakley

Figure 2: Development and Land Use Plan A
Source: City of Oakley

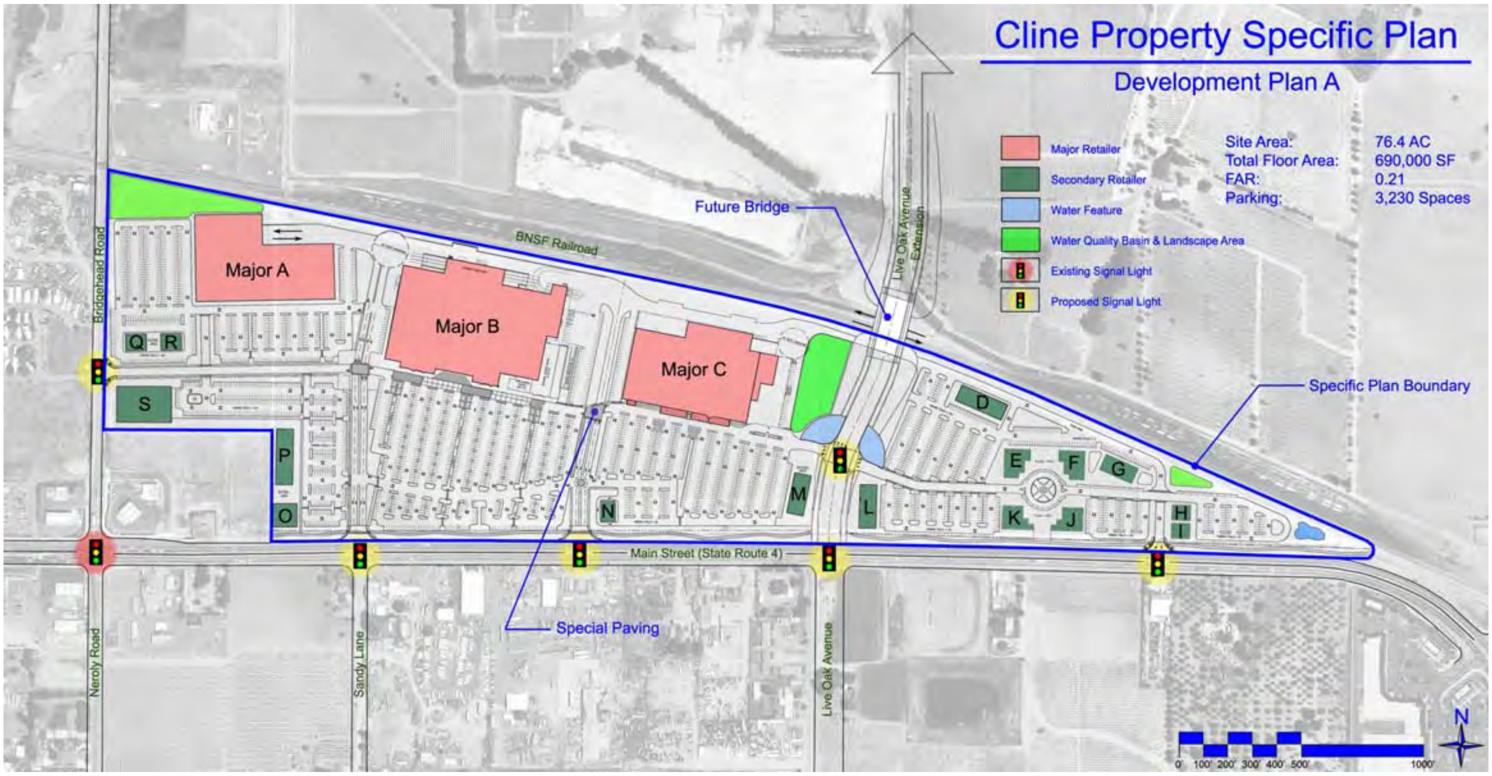
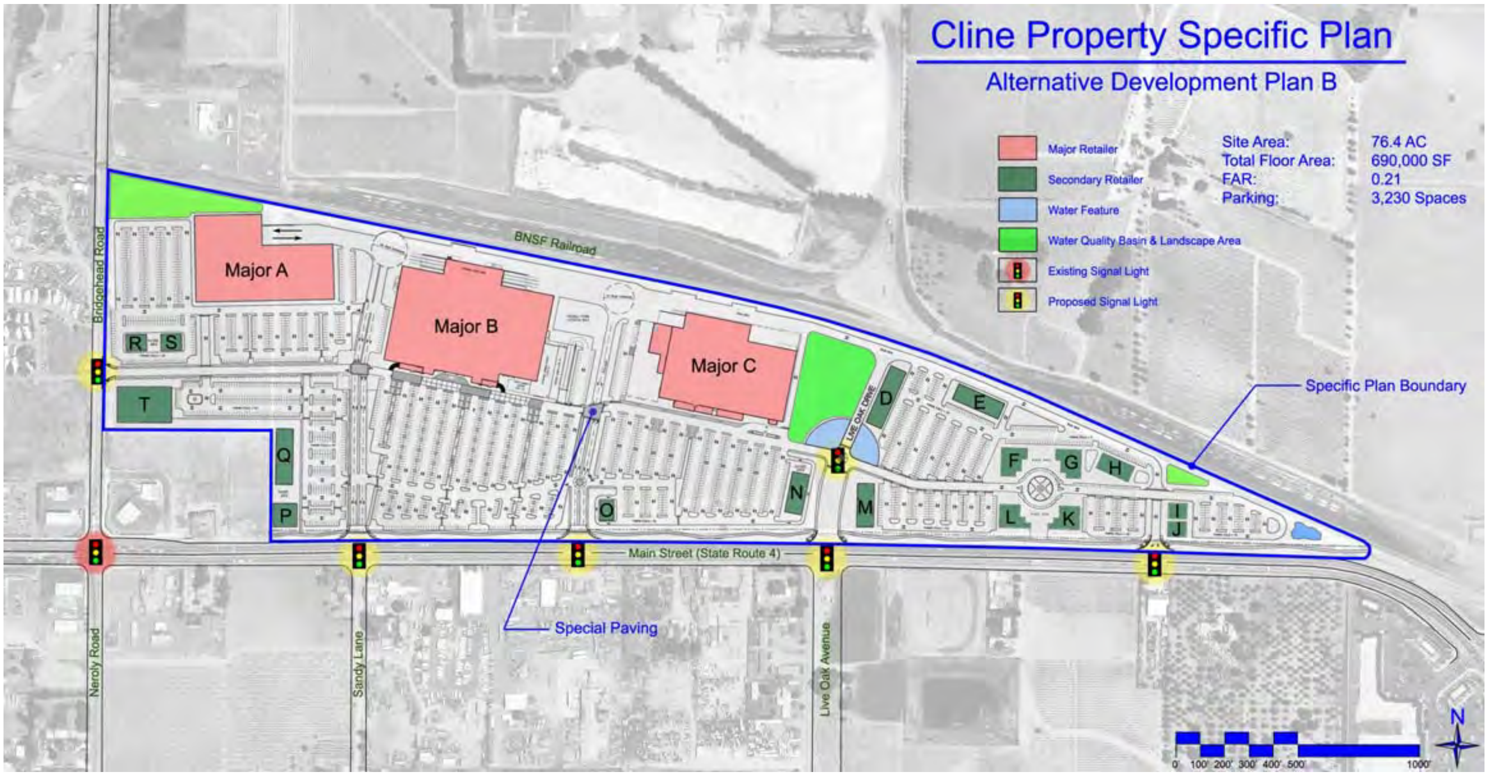


Figure 3: Development and Land Use Plan B
Source: City of Oakley



Project Water Demand

Water demand factors for the land use types are obtained from the Urban Water Management Plan (UWMP), (DWD, 2005). The District provides water service to Oakley. The District's unit water demand for commercial and industrial uses is 2,250 gallons per day (gpd) per acre. This water demand is intended to be applied over a gross area rather than an individual building footprint.

Each Project alternative would have the same total estimated water demand because the gross Project area is fixed at 76.4 acres. The estimated water demand for the proposed Project land uses Plan A and B as provided by the City are presented in Table 1. The total proposed project demand for all alternatives is estimated at 172,000 gpd or 192.7 acre-feet per year (AFY). One acre-foot (AF) of water is approximately 325,829 gallons of water.

Table 1: Estimated Water Demand for Development Plan A and Plan B

Land Use Designation (Industrial)	Building Area (ft^2)	Gross Area (acre)	Water Demand Rate (gpd/acre)	Estimated Water Demand (gpd)	Estimated Water Demand (AFY)
Hotel	30,000				
Restaurant	69,000				
Retail	591,000				
Total Project	3,327,984	76.4	2,250	172,000	192.7

Water Demand Rate of 2,250 gpd is from District Standards.

Table 2 describes the total proposed Project water demand for Alternative 1; estimated at 172,000 gpd or 192.7 AFY.

Table 2: Estimated Water Demand for Development Alternative 1

Land Use Designation (Industrial)	Building Area (ft^2)	Gross Area (acre)	Water Demand Rate (gpd/acre)	Estimated Water Demand (gpd)	Estimated Water Demand (AFY)
Hotel	30,000				
Restaurant	77,000				
Retail	663,000				
Total Project	3,327,984	76.4	2,250	172,000	192.7

Water Demand Rate of 2,250 gpd is from District Standards.

Table 3 describes the total proposed Project water demand for Alternative 2; estimated at 172,000 gpd or 192.7 AFY.

Table 3: Estimated Water Demand for Development Alternative 2

Land Use Designation (Industrial)	Building Area (ft^2)	Gross Area (acre)	Water Demand Rate (gpd/acre)	Estimated Water Demand (gpd)	Estimated Water Demand (AFY)
Hotel	40,000				
Restaurant	63,000				
Retail	527,000				
Total Project	3,327,984	76.4	2,250	172,000	192.7

Water Demand Rate of 2,250 gpd is from District Standards.

Since multiple alternatives are possible for the proposed Project, the largest water demand of the alternatives will be used as the Project demand. The Project water demand is estimated at 172,000 gpd, or 192.7 AFY.

Identification of Public Water System

The proposed Cline Property Project is located entirely within the existing incorporated area of the City. The District is the water purveyor, owner, and operator of the water system within the City of Oakley. The District will therefore be the water purveyor to the proposed Project. The District obtains the majority of its water from the Contra Costa Water District (CCWD), which in turn obtains its water from the Central Valley Project (CVP). The District obtains a small amount of water supply from local groundwater.

The District has determined that the proposed Project is subject to CEQA. As the water purveyor, the District has prepared this WSA according to the 90-day schedule in Section § 10910 of the California Water Code.

Urban Water Management Plan Review

The District adopted its Urban Water Management Plan (UWMP), (DWD, 2005) in 2005. The entire Project area and its build-out land uses are included in the UWMP water demands. This Water Supply Assessment (WSA) is based on the information in the adopted UWMP. The UWMP should be consulted as a reference for detailed information.

Relevant information in the UWMP includes the following:

- Build-out water usage was calculated using build-out land uses from the City of Oakley General Plan, which includes the water demands for the proposed Project area.
- The District's primary water supply is treated water from Contra Costa Water District (CCWD), which in turn gets its water from the Central Valley Project (CVP) managed by the U.S Bureau of Reclamation (USBR).
- The District has developed a groundwater supply system to provide additional supply reliability during dry years and emergencies. The District is currently using the Glen Park well at approximately 0.55 mgd. The maximum pumping capacity is estimated at approximately 2.0 mgd.
- Within the District service area, all wastewater treatment occurs at Ironhouse Sanitary District. Ironhouse Sanitary District produces recycled water that is currently used for irrigation of agricultural lands and is not planned for urban use in conjunction with potable water in the District's service area.
- The District has comprehensive water conservation plans in place to abate water shortages, if needed, in times of decreased supply.
- The UWMP demand projections assume full demands during single and multiple-dry years (3 consecutive dry years), i.e., that customers are not required to ration water use during these dry periods. This assumption provides a conservative comparison of supply versus demand.

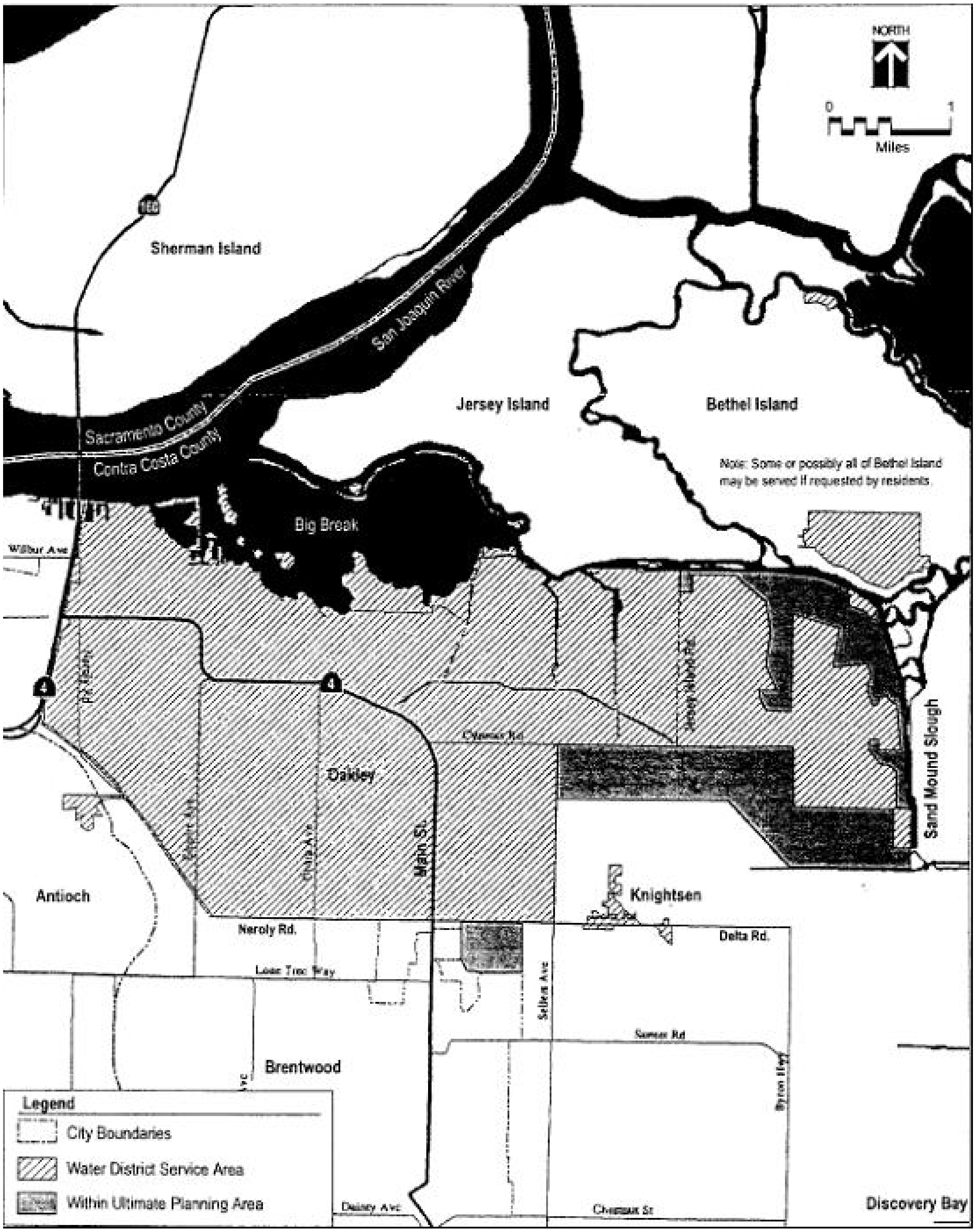
Pursuant to the UWMP, the District has adequate supply sources to meet future needs under all conditions for its entire future planning area, including the Project area. The future planning area consists of the District's service area. The District's service area is presented as Figure 4. The District is entitled to and intends to purchase additional surface water treatment capacity from CCWD, when needed to meet future demands. Ultimately, the District expects to have surface water supply capacity of 15 mgd on an average annual basis; which will ultimately require treatment capacity of 30 mgd for maximum day demand conditions.

The District's groundwater supply is primarily an alternate to surface water supplies for increased reliability, to help provide peaking capacity in the summer during very hot (maximum demand) days, and to enhance flexibility for cost-effectively operating its system. Groundwater will also provide some of the total required annual supply to meet future demands after 2020.

According to the City's General Plan, City build-out is expected to occur in 2040. The amount of groundwater supply capacity needed to meet average annual demands at build-out under normal and single dry year conditions is about 2.5 mgd; and under multiple-dry year conditions is about 4.5 mgd to supplement reduced surface water supply. It is anticipated that this 4.5 mgd capacity would be provided by the existing Glen Park well and 2 planned future wells. Ultimately the District may construct additional wells to have up to 6 to 7 mgd of available groundwater supply to provide additional flexibility for cost-effective system operations and additional reliability during short-term emergencies, such as temporary outages of the surface water treatment plant.

The District may procure additional surface water supply from Contra Costa Water District (CCWD) sooner than was estimated in the UWMP or may investigate other local supply sources, if future groundwater investigation and monitoring indicates that it will not be possible to provide the anticipated amount of groundwater supply in the anticipated timeframes. The timing for future purchases of additional surface water can be adjusted as needed to meet future conditions. With the UWMP estimated timing for future additional surface water supply, groundwater supply is not required to meet annual demands until 2020 even under multiple-dry year conditions. If the full amount of surface water supply were purchased sooner than estimated in the UWMP, then groundwater would not be required to meet annual demands until 2035 even under multiple-dry year conditions. Thus, the further development of groundwater can be delayed through the purchasing of CCWD and CVP water.

Figure 4: Map of District Service Area
Source: 2005 District UWMP



Urban Water Management Plan Supply and Demand Projections

The Urban Water Management Plan (UWMP) estimates the water supply and water demand during normal dry and multiple-dry years. A comparison of the normal year water supply and demand for the District is presented in Table 2.1, projected to 2040. Also in the tables is the groundwater needed to meet demands with the existing purchase schedule and an accelerated water purchase schedule from Contra Costa Water District (CCWD). Additional groundwater is needed to meet anticipated demands in a normal year starting in 2030 assuming the anticipated schedule in the UWMP for purchase of additional increments of surface water capacity from CCWD, or by 2035 with an accelerated purchase schedule.

Table 2.1: Projected Supply and Demand Comparison for Normal Year (MG)

Year	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
Surface Water from CCWD	2,738	3,650	3,650	4,562	4,562	5,457	5,457
DWD groundwater	547	547	1,095	1,095	1,642	1,642	2,189
Supply Total	3,285	4,197	4,745	5,657	6,204	7,099	7,646
Demand	2,324	2,964	3,603	4,242	4,881	5,521	6,350
Difference (Surplus of Supply)	961	1,233	1,142	1,415	1,323	1,578	1,296
Groundwater Needed to Meet Demand in Normal Year assuming anticipated schedule in UWMP for purchase of additional increments of surface water capacity (MG). (1)	0	0	0	0	319	64	893
(MGD)	0.0	0.0	0.0	0.0	0.9	0.2	2.4
Groundwater Needed if DWD purchases their full surface water capacity of 5457 MG by 2030. (1)	0	0	0	0	0	64	893
(MGD)	0	0	0	0	0	0.2	2.4

*MG=Million Gallons

(1) Groundwater includes the existing Glen Park Well plus future wells.

A comparison of the single dry year water supply and demand for the District is presented in Table 2.2 projected to 2040. Groundwater is needed to meet the demands in a single dry year starting in year 2030 assuming anticipated schedule in UWMP for purchase of additional increments of surface water capacity from Contra Costa Water District (CCWD), or by 2035 with an accelerated purchase schedule.

Table 2.2: Projected Supply and Demand Comparison for a Single Dry Year (MG)

	2010	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
Surface Water from CCWD	2,738	3,650	3,650	4,562	4,562	5,457	5,457
DWD groundwater	547	547	1,095	1,095	1,642	1,642	2,189
Supply Total	3,285	4,197	4,745	5,657	6,204	7,099	7,646
Demand	2,324	2,964	3,603	4,242	4,881	5,521	6,350
Difference (Surplus of Supply)	961	1,233	1,142	1,415	1,323	1,578	1,296
Groundwater Needed to Meet Demand in Single Dry Year assuming anticipated schedule in UWMP for purchase of additional increments of surface water capacity (MG). (1)	0	0	0	0	319	64	893
(MGD)	0.0	0.0	0.0	0.0	0.9	0.2	2.4
Groundwater Needed if DWD purchases their full surface water capacity of 5457 MG by 2030. (1)	0	0	0	0	0	64	893
(MGD)	0	0	0	0	0	0.2	2.4

(1) Groundwater includes the existing Glen Park Well plus future wells.

A comparison of the multiple-dry year water supply and demand for the District is presented in Table 2.3 projected to 2040. Groundwater is needed to meet the demand in a multiple-dry year event sometime between 2015 and 2020 with the anticipated schedule in the UWMP for purchase of additional increments of surface water supply from CCWD, or between 2025 and 2030 with an accelerated purchase schedule.

Table 2.3: Projected Supply and Demand Comparison for a Multiple-Dry Year Event (MG)

	2005	2010	2015	2020	2025	2030	2035	2040
Surface Water from CCWD	2,738	2,738	3,103	3,103	3,878	3,878	4,638	4,638
DWD groundwater	0	547	547	1,095	1,095	1,642	1,642	2,189
Supply Total	2,738	3,285	3,650	4,198	4,973	5,520	6,280	6,827
Demand	1,685	2,324	2,964	3,603	4,242	4,881	5,521	6,350
Difference (Surplus of Supply)	1,053	961	686	595	731	639	759	477
Groundwater Needed to Meet Demand in Multiple-Dry Years assuming anticipated schedule in UWMP for purchase of additional increments of surface water capacity (MG). (1)	0	0	0	500	364	1,003	883	1,712
(MGD)	0.0	0.0	0.0	1.4	1.0	2.7	2.4	4.7
Groundwater Needed if DWD purchases their full surface water capacity of 5457 MG by 2020. (The multiple-dry year supply is 4,638 MG) (1)	0	0	0	0	0	243	883	1,712
(MGD)	0	0	0	0	0	1	2.4	4.7

(1) Groundwater includes the existing Glen Park Well plus future wells.

Pursuant to the UWMP, the District water supply reliability is as presented in Table 2.4 The UWMP estimates an increase in the amount of groundwater pumped to meet reasonably anticipated deficiencies from its surface supply. The total supply is projected to meet the total demand through the year 2040 under drought conditions including single dry and multiple-dry years (3 consecutive dry years).

Table 2.4 Water Supply Source Reliability

Supply Source	Average/Normal Water Year	Single Dry Water Year	Multiple Dry Water Years		
			Year 1	Year 2	Year 3
CCWD Surface Supply (1)	100%	100%	100%	100% to 2010 85% after	100% to 2010 85% after
DWD Groundwater	100%	100%	100%	100%	100%

Source: Table 6-1 Diablo Water District UWMP

(1) CCWD surface supply reliability estimate provided by CCWD to DWD.

Pursuant to the UWMP, CCWD will supply the District with 100% of its surface water supply during normal and single dry years. However, during multiple-dry years, surface water supplies from CCWD will be reduced to 85% of the normal supply.

Water Supply Entitlements, Water Rights, or Service Contracts

The District's primary water supply for its service area is treated surface water from the Central Valley Project purchased from its wholesale provider, the Contra Costa Water District (CCWD). CCWD contracts with the U.S. Bureau of Reclamation for water from the Central Valley Project. The Central Valley Project water is conveyed through the Contra Costa Canal, and treated at the Randall-Bold Water Treatment Plant (RBWTP) in Oakley, which is jointly owned by the District and CCWD. CCWD has a contract with the U.S. Bureau of Reclamation for 195,000 AFY of water from the Central Valley Project.

The raw surface water is supplied via the Contra Costa Canal (at approximately mile post 7.1) that conveys water from Rock Slough in the Sacramento-San Joaquin Delta. The canal is owned by the Bureau of Reclamation and operated by CCWD. The canal water can also be supplemented by surface water stored at CCWD's Los Vaqueros Reservoir. The Los Vaqueros Reservoir is a 100,000 acre-foot storage facility located 8 miles south of the City of Brentwood.

The District currently has a joint powers agreement with CCWD for 15 MGD of treated water from the RBWTP, with the right to purchase additional capacity up to a total of 30 Million Gallons per Day (MGD). Accommodating build out of the District's ultimate service area will require expansion of the existing RBWTP, which has a capacity of 40 MGD and is expandable to 80 MGD.

The District must purchase additional water rights in 5 MGD increments. The District anticipates purchasing this additional capacity in years 2015, 2025, and 2035. However this schedule can be adjusted to purchase additional capacity sooner, if needed (DWD, 2005).

The District also maintains emergency service ties to the neighboring City of Antioch. The City of Antioch currently obtains its water through CCWD. This connection, however, cannot be used as a water supply source.

Groundwater Supply and Basin Description

The District's groundwater provides additional supplies to supplement surface water and to meet the projected demands of the service area. Groundwater from Glen Park wells is conveyed in a dedicated well supply pipeline to a blending facility located near the Randall-Bold Water Treatment Plant (RBWTP). At the blending facility, the groundwater is treated and blended with treated surface water within the

District's distribution system, prior to distribution; there are negligible impacts on water quality.

The first well, the Glen Park Well was put into service in August of 2006. The Glen Park Well has an estimated maximum pumping capacity of approximately 1,500 gallons per minute (gpm), approximately 2.0 MGD; and is currently operating at an average annual rate of approximately 0.55 mgd. There are no signs of lowering of groundwater level due to pumping at the Glen Park well. The District intends to construct additional wells in the future to provide more groundwater capacity. Expansion of the groundwater supply system will be based upon the performance of the Glen Park well. The District is conducting ongoing data collection and monitoring of groundwater levels and groundwater quality, as well as consulting with other well operators to monitor effects on other wells in the region.

The Urban Water Management Plan (UWMP) contains a description of the groundwater supply system and groundwater basin. The wells will be in a groundwater basin that has been studied since the late 1990's by Luhdorff & Scalmanini Consulting Engineers (LSCE). A description of the groundwater basin is in the "Investigation of Groundwater Resources in East Contra Costa County" (LSCE, 1999). This investigation was supplemented by additional studies conducted by LSCE when the Glen Park Well was designed and constructed during 2003-2005.

The groundwater basin is not adjudicated (pumping rights have not been set by a court or Board decision) and has not been studied by the California Department of Water Resources. The groundwater basin is not in overdraft. The District is currently preparing a groundwater management plan, on a voluntary basis, according to the procedures outlined in the Groundwater Management Planning Act (Sections 10546-10750 of the California Water Code AB 3030).

The District wells will be located within the region identified as the Marginal Delta Dunes region (LSCE, 1999). Historical conditions suggest that for much of this region, extraction activities have not exceeded the sustainable yield of the groundwater system. Sustainable yield is unlikely to be exceeded because of the general lack of groundwater development throughout much of these areas. In addition, areas in the vicinity of the river and Delta systems, such as the Marginal Delta Dunes region, have a large source of potential recharge, which could offset potential adverse impacts due to increased extraction.

Based on the groundwater investigations conducted to date, the potential appears low for adverse impacts on existing wells in the area. The Glen Park well site was chosen to minimize impacts based on a regional groundwater investigation. The design of the Glen Park well and future District wells is based on wide spacing of the wells from each other to minimize interference and localized impacts, and constructing deep wells with deep annular seals to both avoid impacts to shallow wells in the area and to isolate the District's wells from impacts that may be caused by those wells. Testing during seven days of continuous pumping at the Glen Park Well in April 2004 had no measurable or discernable impact on water levels in nearby shallow wells (DWD, 2005).

The closest municipal well to the Glen Park site is the City of Brentwood Well 14. The April 2004 testing indicated that there would be approximately ten feet of drawdown at Brentwood Well when pumping at 3 mgd for 30 days. At the Glen Park Well, the test pumping rate is greater than the anticipated 1.5 mgd average and greater than the anticipated 2 mgd maximum well pumping capacity. It was concluded that even pumping at 3 mgd would not be expected to adversely affect the operation of the Brentwood Well, i.e., the amount of the additional drawdown due to Glen Park pumping would not significantly affect the Brentwood pumping operations (DWD, 2005).

The ongoing monitoring will also consider potential water quality impacts. Well pumping could potentially cause water quality degradation if pumping were to induce vertical movement of groundwater from one aquifer to another, i.e., from shallow groundwater to deep groundwater. However, based on several groundwater investigations conducted from 1999 through 2004, the anticipated pumping rates of about 1 to 2 mgd at each well (1.5 mgd on average) are not expected to induce local groundwater quality degradation locally or regionally. Groundwater quality impacts are unlikely to occur due to the multiple clay layers between the aquifers, and the deep annular seals on the District wells (DWD, 2005).

In the event that local wells were to be adversely affected (i.e., lowering of groundwater below existing pumps or degradation of water quality), mitigating actions would be taken by the District on a case-by-case basis and could include supplying the project with a different source of water, lowering or replacing pumps, or installing new wells at alternate locations.

If the District determines that additional groundwater wells would adversely affect other wells in the local area, the District could accelerate the purchase of its next entitled installment of water supply from the Contra Costa Water District's (CCWD) Central Valley Project water. The District currently is entitled to purchase 15 mgd of treated water from CCWD. The District has the right to purchase additional capacity up a total of 30 mgd, to be purchased in 5 mgd increments (DWD, 2005). Although it is currently anticipated that the District will purchase the 5 mgd increments of additional capacity in 2015, 2025, and 2030, the District may exercise its rights to each 5 mgd increment at any time, provided that CCWD is notified at least three years prior. Thus, if the District purchases its full capacity of 30 mgd earlier than anticipated, it would not need to rely on groundwater supply at all to meet all projected demands for the next 20 years. The District may also seek out other alternative sources of water that could be available at a future date.

Conclusion

The proposed Project would create a maximum estimated water demand of 172,000 gpd (192.7 AFY). The Diablo Water District has included the development area and its build out demands in its Urban Water Management Plan (UWMP). The UWMP identifies the availability of sufficient water supply to meet future needs projected to build out at 2040 under all conditions including normal, single dry year, and multiple-dry years.

The Diablo Water District concludes that sufficient water supply exists to support the proposed Cline Property Project as described above. The District's 2006 Facilities Plan contains a detailed plan for major water system improvements that will be implemented to serve new development, including the Project area, and is based on the same demand projections of the UWMP. Existing potable water pipelines will be extended to the Project area for delivery of water; and the Project will participate in funding its share of storage, transmission and supply improvements. The specific facility requirements for the development will be determined when the specific development plans are prepared. All facility costs required to serve the development will be borne by the developers.

References

City of Oakley, December 16, 2002. City of Oakley 2020 General Plan, Pacific Municipal Consultants.

City of Oakley (City), Staff. Personal communications with City staff.

Contra Costa Water District Planning Department. December 2005. Urban Water Management Plan.

Diablo Water District, 2004, Glen Park Well Utilization Project, Initial Study.

Diablo Water District, December 2005. Urban Water Management Plan, Final Report. CDM.

Luhdorff & Scalmanini Consulting Engineers (LSCE), 1999. "Investigation of Groundwater Resources in East Contra Costa County."

San Francisco Bay Regional Water Quality Control Board. November 2004. Water Quality Control Plan (Basin Plan) for the San Francisco Bay Basin.

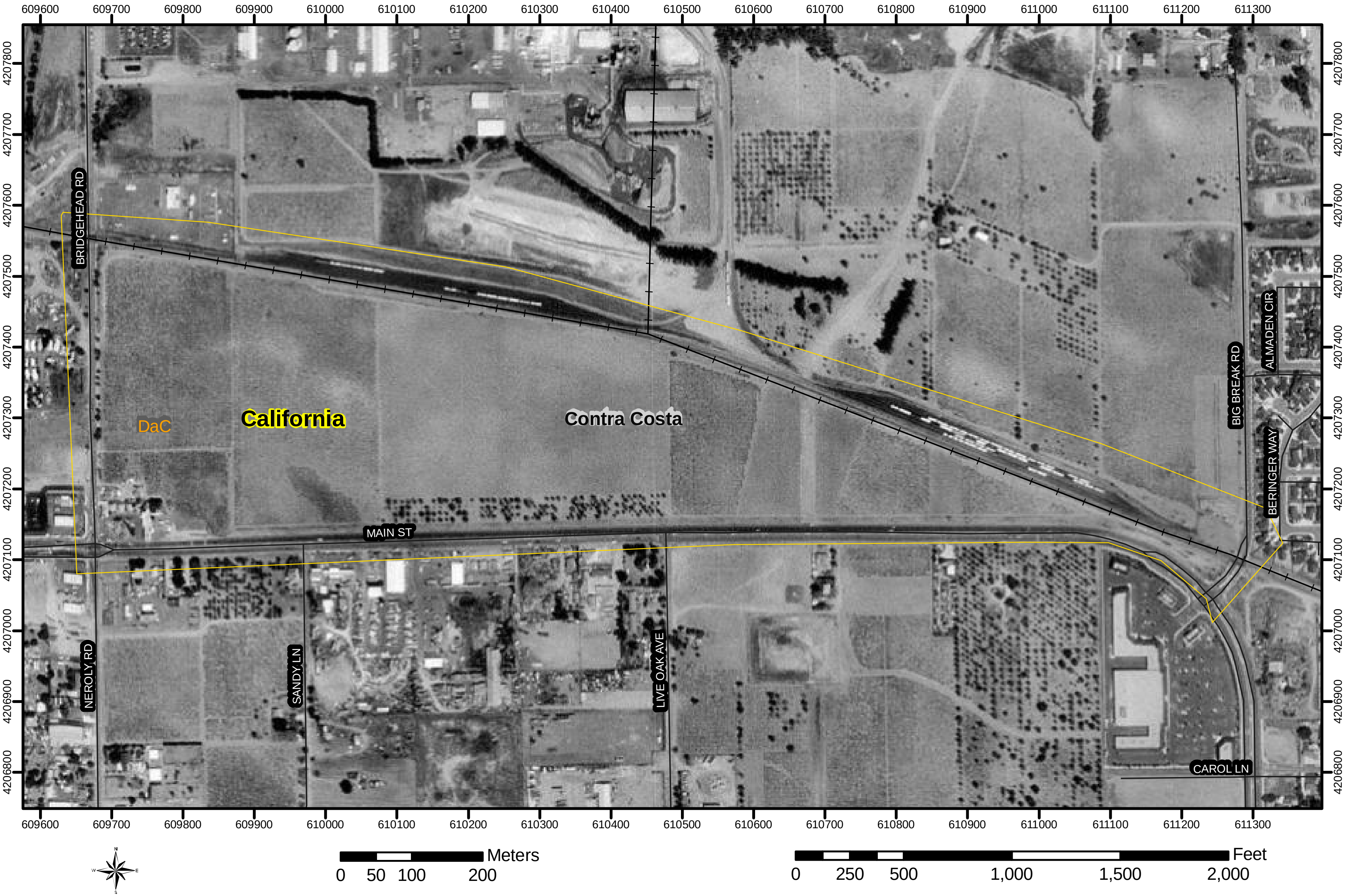
U.S. Department of the Interior Bureau of Reclamation. June 2004. Long-Term Central Valley Project Operations and Criteria Plan (CVP-OCAP). Sacramento, California.

U.S. Department of the Interior Bureau of Reclamation. October 2005. Municipal and Industrial Water Shortages Policy, Central Valley Project, California, Environmental Assessment. Sacramento, California.

Appendix K

Soil Classifications

SOIL SURVEY OF CONTRA COSTA COUNTY, CALIFORNIA



USDA Natural Resources Conservation Service

MAP LEGEND

▭	Soil Map Units
●	Cities
▭	Detailed Counties
▭	Detailed States
—	Interstate Highways
—	Roads
–+–+–	Rails
🟦	Water
—	Hydrography
🟦	Oceans
▲▼▲▼▲▼	Escarpment, bedrock
∨∧∨∧∨∧	Escarpment, non-bedrock
∿∿∿∿∿	Gulley
‖‖‖‖‖‖	Levee
··········	Slope
◡	Blowout
⊠	Borrow Pit
※	Clay Spot
◆	Depression, closed
≑	Eroded Spot
✕	Gravel Pit
∴	Gravelly Spot
∼	Gulley
Λ	Lava Flow
⊖	Landfill
⊥	Marsh or Swamp
◎	Miscellaneous Water
∨	Rock Outcrop
+	Saline Spot
⁙	Sandy Spot
}	Slide or Slip
◇	Sinkhole
∅	Sodic Spot
≋	Spoil Area
○	Stony Spot
∞	Very Stony Spot
◉	Perennial Water
ψ	Wet Spot

MAP INFORMATION

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov

Coordinate System: UTM Zone 10

Soil Survey Area: Contra Costa County, California
Spatial Version of Data: 1
Soil Map Compilation Scale: 1:24000

Map comprised of aerial images photographed on these dates:
6/12/1993; 6/15/1993; 6/16/1993

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend Summary

Contra Costa County, California

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
DaC	DELHI SAND, 2 TO 9 PERCENT SLOPES	135.4	100.0

Prime and other Important Farmlands

Contra Costa County, California

Map symbol	Map unit name	Farmland classification
DaC	DELHI SAND, 2 TO 9 PERCENT SLOPES	Farmland of statewide importance

Tabular Data Version: 5
Tabular Data Version Date: 12/20/2006

Appendix L

City Council Resolution Certifying Review of Program EIR for Redevelopment Plan Amendment No. 1, and Adopting Related Mitigation Findings, a Statement of Overriding Considerations, and a Mitigation Monitoring Program

IN THE CITY COUNCIL OF THE CITY OF OAKLEY

RESOLUTION NO. _____

RESOLUTION CONFIRMING REVIEW AND CONSIDERATION OF THE PROGRAM ENVIRONMENTAL IMPACT REPORT FOR THE RESTATED AND AMENDED REDEVELOPMENT PLAN FOR THE OAKLEY REDEVELOPMENT PROJECT AREA AND ADOPTING FINDINGS RELATED THERETO

WHEREAS, the Oakley Redevelopment Agency ("Agency") has prepared the Restated and Amended Redevelopment Plan for the Oakley Redevelopment Project Area ("Restated and Amended Redevelopment Plan") in compliance with the California Community Redevelopment Law (Health and Safety Code Section 33000, et seq.) for adoption by the City Council ("City Council") of the City of Oakley ("City"); and

WHEREAS, pursuant to the California Environmental Quality Act ("CEQA") (Public Resources Code Section 21000, et seq.) and the guidelines adopted thereunder ("CEQA Guidelines") (California Code of Regulations Title 14, Section 15000, et seq.), the Agency is the "Lead Agency" as defined by CEQA Section 21067 and in accordance with CEQA Guidelines Sections 15050 and 15051; and

WHEREAS, on July 24, 2001, the Agency released for public review and comment a draft program Environmental Impact Report ("Draft Program EIR") on the proposed Restated and Amended Redevelopment Plan pursuant to CEQA and the CEQA Guidelines; and

WHEREAS, the forty-five day public review and comment period on the Draft Program EIR began on July 25, 2001, and closed on September 7, 2001, and included the opportunity to give oral comments on the Draft Program EIR at a public hearing before the Oakley Planning Commission on September 4, 2001; and

WHEREAS, at the public hearing and through submitted written comments, which written comments were received after the forty-five day public review and comment period, the Agency received comments on the Draft Program EIR from the public, governmental agencies, as well as from Planning Commission members; and

WHEREAS, the Agency prepared responses to comments on environmental issues, which responses clarify and amplify the information contained in the Draft Program EIR, providing good faith reasoned analysis supported by factual information, and the comments and responses to comments were published in a final program Environmental Impact Report ("Final Program EIR") in September, 2001, prepared pursuant to CEQA and the CEQA Guidelines; and

WHEREAS, the City, as "Responsible Agency" as defined by CEQA Section 21069, has consulted with the Lead Agency in order to assist the Lead Agency in preparing adequate environmental documents for the project; and

WHEREAS, the Agency caused to be prepared the Final Program EIR pursuant to CEQA and the CEQA Guidelines; and

WHEREAS, pursuant to CEQA Guidelines Section 15090, the Agency acting as the Lead Agency has certified that the Final Program EIR (i) has been completed in compliance with CEQA, (ii) was presented to the decisionmaking body of the Lead Agency and that the decisionmaking body reviewed and considered the information contained in the Final Program EIR prior to approving the Restated and Amended Redevelopment Plan, and (iii) reflects the Lead Agency's independent judgment and analysis; and

WHEREAS, pursuant to the public notice duly given, a full and fair joint public hearing of the Agency and the City Council has been held on the Restated and Amended Redevelopment Plan and the Final Program EIR, and the City Council has considered all written and oral comments and testimony relating thereto and is fully advised thereon; and

WHEREAS, the City Council, acting as a Responsible Agency pursuant to CEQA Guidelines Section 15096, has considered the Draft Program EIR and the Final Program EIR as prepared by the Lead Agency; and

WHEREAS, the City Council has not found any feasible alternative or mitigation measures within its powers that would substantially lessen or avoid any significant effect the project would have on the environment that have not been identified already by the Lead Agency.

NOW THEREFORE, THE CITY COUNCIL OF THE CITY OF OAKLEY DOES RESOLVE AS FOLLOWS:

<u>Section 1</u>. The City Council has reviewed and considered the environmental effects of the project as contained in the Final Program EIR prior to deciding whether to approve the Restated and Amended Redevelopment Plan.

<u>Section 2</u>. The findings in attached Exhibits A, B and C are hereby adopted.

<u>Section 3</u>. The Statement of Overriding Considerations in attached Exhibit D is hereby adopted.

<u>Section 4</u>. The Mitigation Monitoring and Reporting Program in attached Exhibit E is hereby adopted.

<u>Section 5</u>. The following Exhibits, attached hereto, are hereby incorporated by reference.

Exhibit A: Findings Concerning Significant Impacts and Mitigation Measures

Exhibit B: Less Than Significant Environmental Impacts

Exhibit C: Findings Concerning Alternatives

Exhibit D: Statement of Overriding Considerations

Exhibit E: Mitigation Monitoring and Reporting Program

I hereby certify that the foregoing Resolution No. _______ was duly introduced and adopted by the City Council of the City of Oakley at a regular meeting held on _______________, 2001 by the following vote:

COUNCIL MEMBERS:

AYES:

NOES:

ABSENT:

ABSTAIN:

ATTEST:

____
City Clerk

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EXHIBIT A

Findings Concerning Significant Impacts and Mitigation Measures

Pursuant to CEQA Section 21081 and CEQA Guidelines Section 15091, the following findings address the project's significant and potentially significant impacts and means for mitigating those impacts. In each case, the appropriate statutory finding is followed by an explanation of how identified mitigations lessen or avoid the related impact. Findings pursuant to CEQA Section 21081 concerning project alternatives are made in Exhibit C.

GENERAL CONSIDERATIONS

1. Reliance on Record. The findings and determinations contained herein are based on the competent and substantial evidence, both oral and written, contained in the entire record relating to the Restated and Amended Redevelopment Plan and the final Program EIR. The findings and determinations constitute the independent findings and determinations of the City Council in all respects and are fully and completely supported by substantial evidence in the record as a whole.

2. Nature of Findings. Any finding made herein by the City Council shall be deemed made, regardless of where it appears in this document. All of the language included in this document constitutes findings by the City Council, whether or not any particular sentence or clause includes a statement to that effect. The City Council intends that if these findings fail to cross-reference or incorporate by reference any other part of these findings, that any finding required or permitted to be made by the City Council with respect to any particular subject matter of the Restated and Amended Redevelopment Plan shall be deemed made if it appears in any portion of these findings.

3. Scope of Review. The final Program EIR is a program EIR prepared pursuant to CEQA Guidelines Section 15168. The Restated and Amended Redevelopment Plan is a series of actions that can be characterized as one large project and is related as logical parts in the chain of contemplated actions and in connection with the implementation of the Restated and Amended Redevelopment Plan that will govern the conduct of the continuing redevelopment program. Subsequent activities in the redevelopment program will be examined in light of the final Program EIR to determine whether an additional environmental document must be prepared.

4. Limitations. The City Council's analysis and evaluation of the Restated and Amended Redevelopment Plan is based on the best information currently available. It is inevitable that in evaluating a project of the scope and size of the Restated and Amended Redevelopment Plan that absolute and perfect knowledge of all possible aspects of the project will not exist. This practical limitation is acknowledged in CEQA Guidelines Section 15151 which states that "the sufficiency of an EIR is to be reviewed in the light of what is reasonably

feasible." One of the major limitations on analysis of the project is the City Council's lack of knowledge of future events, particularly those occurring outside the City. In some instances, the City Council's analysis has had to rely on assumptions about such factors as growth and traffic generation in areas outside of the political boundaries of the City. In all instances, best efforts have been made to form accurate assumptions. Somewhat related to this are the limitations on the City Council's ability to solve what are in effect regional, state, and national problems and issues. The City must work within the political framework in which it exists and within the limitations inherent in that framework.

5. Summaries of Facts, Impacts, Mitigation Measures, Alternatives, and other Matters. All summaries of information in the findings to follow are based on the final Program EIR, the Restated and Amended Redevelopment Plan, and/or other evidence in the record. Such summaries are not intended to be exhaustive recitations of all of the facts in the record upon which they are based. Moreover, the summaries of impacts and mitigation measures are only summaries. This document includes only as much detail as may be necessary to show the basis for the findings set forth below. Cross references to the final Program EIR and other evidence such as City Council or Agency actions have been made where helpful, and reference should be made directly to the final Program EIR and other evidence in the record for more precise information regarding the facts on which any summary is based. Conflicting interpretations of the language of the final Program EIR and the language of mitigation measures adopted by the City Council shall be resolved in favor of the latter as the most appropriate way to mitigate the impact in question.

6. Adoption of Mitigation Measures. These findings address the numerous mitigation measures recommended in the final Program EIR for impacts identified as significant or potentially significant. Some of the mitigation measures are implemented by changes incorporated into the redevelopment program and others by adoption of standards in the Restated and Amended Redevelopment Plan. In its actions approving the Restated and Amended Redevelopment Plan, the City Council adopts those mitigation measures recommended in the final Program EIR that have not already been incorporated into the project except with respect to those that are rejected by the City Council in the specific findings as being infeasible or unnecessary. Where multiple mitigation measures are adopted for a single impact, all of the identified measures are required to support the related mitigation finding, unless otherwise specified. The City Council finds that all the mitigation measures now or previously incorporated into the redevelopment project are desirable and feasible and shall be implemented in connection with the implementation of the Restated and Amended Redevelopment Plan in accordance with the adopted Mitigation Monitoring and Reporting Program.

7. Effectiveness of Mitigation Measures. The final Program EIR for the project recommended mitigation measures to reduce most of the significant and potentially significant environmental effects to insignificant levels. The City Council reviewed the final Program EIR and agrees with the final Program EIR conclusions. The City Council finds that to the extent any residual impact remains that has not been fully mitigated in those instances where the City

Council finds that mitigation has occurred, the residual impact is overridden by the Statement of Overriding Considerations provided for in Exhibit D.

IMPACTS, MITIGATIONS AND MITIGATION FINDINGS

IMPACT TO GEOLOGY/SOILS: The potential impacts of the public improvement projects pursuant to the Restated and Amended Redevelopment Plan could include changes in topography due to grading and trenching and short-term soil erosion impacts due to wind and rain. Similar soils and geology impacts could also occur with construction and development of private development projects pursuant to the Restated and Amended Redevelopment Plan.

> MITIGATION: The City or Agency, as appropriate, shall review all development plans for potential soil erosion impacts and require the incorporation of all applicable soil erosion prevention measures deemed appropriate by the City Engineer into projects as applicable to minimize soil erosion during project construction and the life of the project. The City or Agency, as appropriate, shall review all development plans for potential grading impacts and require changes to projects as necessary to minimize mass grading.
>
> FINDINGS: Changes or alterations have been required in, or incorporated into, the project which avoid or substantially lessen the potentially significant environmental impacts as identified in the final Program EIR.
>
> RATIONALE: The final Program EIR is a program EIR prepared pursuant to CEQA Guidelines Section 15168 and analyzing a series of separate projects contemplated as part of the continuing Restated and Amended Redevelopment Plan. Analysis prepared for specific projects will identify project-specific impacts and require implementation of mitigation measures. This identified mitigation measure will ensure that potential geology/soils impacts are reduced to a level of less than significant.

IMPACT TO HYDROLOGY/DRAINAGE AND WATER: The Restated and Amended Redevelopment Plan could impact water quality, including the San Joaquin River, due to erosion and/or siltation during and after project construction. The Restated and Amended Redevelopment Plan will also encourage new private development in the Project Area that will generate increased amounts of surface water due to a decrease of permeable surfaces.

> MITIGATION: All development projects as determined by the City's Community Development Department shall prepare a preliminary hydrology study to determine whether or not the existing storm drain system serving the project has capacity to handle the runoff from the site. All projects shall comply with all applicable NPDES requirements and when necessary incorporate all applicable surface water pollution control measures to reduce or eliminate urban pollutants from entering local surface waters. All development projects within one-quarter mile of the Contra Costa Canal shall be submitted to the Contra Costa Water District for review and approval prior to the

issuance of a grading or building permits. Land Rights Permits shall be obtained from Contra Costa Water District prior to the construction of any projects or storm drain improvements within the canal right-of-way.

FINDINGS: Changes or alterations have been required in, or incorporated into, the project which avoid or substantially lessen the potentially significant environmental impacts as identified in the final Program EIR.

RATIONALE: The final Program EIR is a program EIR prepared pursuant to CEQA Guidelines Section 15168 and analyzing a series of separate projects contemplated as part of the continuing Restated and Amended Redevelopment Plan. Analysis prepared for specific projects will identify project-specific impacts and require implementation of mitigation measures. This identified mitigation measure will ensure that potential hydrology/drainage and water impacts are reduced to a level of less than significant.

IMPACT TO TRAFFIC AND CIRCULATION: The construction of public and private development projects in the Project Area could result in potential traffic or circulation impacts. Development and redevelopment of existing properties, and new construction of buildings and improvement projects will generate traffic during and after project construction. The traffic generated by construction activities could impact specific road segments and local intersections. Traffic impacts such as congestion, delays and the re-routing of traffic, could also occur during construction of street improvement projects.

MITIGATION: The City or Agency, as appropriate, shall review all projects for potential traffic and circulation impacts, including safety and congestion, when submitted for approval. A traffic analysis shall be prepared to evaluate the potential traffic and circulation impacts when the City or Agency, as appropriate, determines a project could have significant traffic or circulation impacts. The City or Agency, as appropriate, shall review all projects to change, modify or incorporate measures accordingly to reduce identified significant traffic and circulation impacts to a level of less than significant.

FINDINGS: Changes or alterations have been required in, or incorporated into, the project which avoid or substantially lessen the potentially significant environmental impacts as identified in the final Program EIR.

RATIONALE: The final Program EIR is a program EIR prepared pursuant to CEQA Guidelines Section 15168 and analyzing a series of separate projects contemplated as part of the continuing Restated and Amended Redevelopment Plan. Analysis prepared for specific projects will identify project-specific impacts and require implementation of mitigation measures. This identified mitigation measure will ensure that potential traffic and circulation impacts are reduced to a level of less than significant.

IMPACT ON AESTHETICS: Construction of certain improvement projects will have short-term aesthetic impacts associated with construction equipment and open trenches during construction, and also due to the presence of construction and grading equipment. The construction of other projects could have aesthetic impacts depending on their design, height, and architecture.

MITIGATION: The Oakley Redevelopment Area Planned Unit District shall be amended to include the Added Project Area being added to the Oakley Redevelopment Project Area. Upon evaluation of specific redevelopment projects by the Agency or the City, as appropriate, if potential aesthetic impacts are determined to exist, the following measures shall be implemented where appropriate: Construction equipment staging areas and storage of materials shall be required to be screened from public view or located in an area away from direct public view. The City or Agency, as appropriate, shall review all projects for potential aesthetic impacts and if it is determined a project could have significant aesthetic impacts, proper measures as suggested by the City or Agency, as appropriate, to reduce impacts to a level of insignificance shall be incorporated into the project.

FINDINGS: Changes or alterations have been required in, or incorporated into, the project which avoid or substantially lessen the potentially significant environmental impacts as identified in the final Program EIR.

RATIONALE: The final Program EIR is a program EIR prepared pursuant to CEQA Guidelines Section 15168 and analyzing a series of separate projects contemplated as part of the continuing Restated and Amended Redevelopment Plan. Analysis prepared for specific projects will identify project-specific impacts and require implementation of mitigation measures. This identified mitigation measure will ensure that potential impacts on aesthetics are reduced to a level of less than significant.

IMPACT ON NOISE: The short-term noise impacts of private development projects include the operation of construction equipment, the movement of construction materials and equipment, and delivery trucks. The long-term noise impacts associated with private development include noise that will be generated due to the daily operations of a business and the operation of vehicular traffic. Short-term noise impacts of public projects will be associated with construction activities. Certain proposed circulation improvement projects could change traffic patterns resulting in an increase in existing traffic noise levels in areas where roads do not currently exist.

MITIGATION: The City or Agency, as appropriate, shall review all projects for potential noise impacts and if it is determined a project could have significant noise impacts that do not comply with the Noise Element, proper measures as suggested by the City or Agency, as appropriate, to reduce noise levels in compliance with the City's Noise Element shall be incorporated into the project.

FINDINGS: Changes or alterations have been required in, or incorporated into, the project which avoid or substantially lessen the potentially significant environmental impacts as identified in the final Program EIR.

RATIONALE: The final Program EIR is a program EIR prepared pursuant to CEQA Guidelines Section 15168 and analyzing a series of separate projects contemplated as part of the continuing Restated and Amended Redevelopment Plan. Analysis prepared for specific projects will identify project-specific impacts and require implementation of mitigation measures. This identified mitigation measure will ensure that potential noise impacts are reduced to a level of less than significant.

IMPACT ON AIR QUALITY: The construction and operation of projects pursuant to the proposed Restated and Amended Redevelopment Plan will have air emission impacts. The Restated and Amended Redevelopment Plan could indirectly have significant adverse air quality impacts by funding and assisting in the construction of projects that exceed air emission thresholds and emit ozone in a basin that is non-attainment. The construction of projects will generate short-term air emissions due to construction workers driving to and from the construction site, trucks delivering construction materials, dust and other particulates generated during demolition of existing buildings, the operation of grading and other construction equipment, and emissions from off-site generation of electricity to power construction equipment. Certain public projects will generate long-term air emissions due to people driving to and from these projects and the operation of mechanical equipment. The development of private projects will also generate long-term air emissions by the operation of motor vehicles, on-site boilers, water heaters, furnaces, and other mechanical equipment.

MITIGATION: All projects shall be reviewed by the City or Agency, as appropriate, for potential air quality impacts. The City or Agency, as appropriate, shall incorporate all applicable air emission reduction measures to reduce air emissions to comply with air emission thresholds adopted by the BAAQMD. In addition, the City or Agency, as appropriate, shall incorporate new short and long-term air emission reduction measures in the future as applicable to further reduce project air emissions.

FINDINGS: Even with the mitigations identified in the final Program EIR, the impacts to air quality will not be reduced to a level of insignificance. Therefore, a Statement of Overriding Considerations must be adopted upon approval of the project.

RATIONALE: The mitigations will serve to reduce air emissions typically associated with most projects anticipated to be developed under the Restated and Amended Redevelopment Plan, but will not reduce the impacts to a less than significant level. There will be significant air quality impacts indirectly associated with adoption and implementation of the Restated and Amended Redevelopment Plan even with incorporation of the mitigations.

IMPACT ON WATER SERVICE: Additional water demand from certain projects could impact Diablo Water District's water supply and ability to provide an adequate source of water. The construction of new development will require water for drinking, fire suppression and to maintain landscaping. The adoption and implementation of the Restated and Amended Redevelopment Plan could impact the local water supply and reduce the capacity of existing or planned water supply and distribution facilities.

MITIGATION: Require ultra low flow toilets that have a minimum 2-inch glazed trap-way and use 1.6 gal./flush. Require low flow showerheads using a maximum of 2.5 gal/min. and have a manual shut-off valve that can be used to further reduce water flow. Require the use of aerators or laminar flow devices on kitchen and lavatory faucets to reduce the maximum flow to 1.6 gal./min. Encourage the use of high-efficiency washing machines. Require that new homes with water pressure in excess of 70 psi be required to install pressure-reducing valves set at 60 psi. Encourage the installation of hot water heater recirculation pumps with time clocks to reduce the amount of water wasted while waiting for hot water. Encourage the installation of high-efficiency dishwashers. Require that all hot water pipes be insulated. Prohibit gutter flooding. Prohibit single-pass cooling systems. Prohibit non-recirculating systems in new car washes. Prohibit non-recirculating systems in all decorative fountains. Require that irrigation systems for all new landscaping be connected to automatic timers. Require that at least 90 percent of plants in non-turf areas be drought resistant. Require that non-drought tolerant plants be grouped together and irrigated separately. Require that a minimum of 2-inches of mulch be added to the soil surface after planting. Require that sprinkler systems be designed to provide minimum runoff and over spray onto non-irrigated areas and that they not be used in areas less than eight feet wide. Require that developers provide new home buyers with landscaping that complies with Water Conservation Landscaping Article 82-26-2.

FINDINGS: Changes or alterations have been required in, or incorporated into, the project which avoid or substantially lessen the potentially significant environmental impacts as identified in the final Program EIR.

RATIONALE: The mitigations will ensure that water conservation measures will be carried out. By requiring these measures to be carried out, the mitigation will lessen the impact on water supply. With implementation of the mitigation measures listed, impacts on water supply will be reduced to a less than significant level.

IMPACT ON POLICE PROTECTION: The development of projects under the Restated and Amended Redevelopment Plan will require police protection services that could cumulatively impact the Police Department's ability to provide an adequate level of police protection. As the Project Area redevelops there will be an increase in police service demands. Future development in the Project Area along with development in other parts of the City will cumulatively increase the need for additional police personnel and equipment.

MITIGATION: The City or Agency, as appropriate, shall review all development projects for police protection impacts and ensure the provision of additional police personnel and/or equipment as necessary to provide an acceptable level of police protection services deemed acceptable by the Police Department.

FINDINGS: Changes or alterations have been required in, or incorporated into, the project which avoid or substantially lessen the potentially significant environmental impacts as identified in the final Program EIR.

RATIONALE: The final Program EIR is a program EIR prepared pursuant to CEQA Guidelines Section 15168 and analyzing a series of separate projects contemplated as part of the continuing Restated and Amended Redevelopment Plan. Analysis prepared for specific projects will identify project-specific impacts and require implementation of mitigation measures. This identified mitigation measure will ensure that potential police protection impacts are reduced to a level of less than significant.

IMPACT ON FIRE PROTECTION: New development and redevelopment will require fire protection services including plan check, fire inspections and fire service calls that could impact the Fire Department. The adoption and implementation of the Restated and Amended Redevelopment Plan could have significant impacts due to cumulative increased calls for fire protection services within the Project Area and the City.

MITIGATION: The City or Agency, as appropriate, shall review all development projects for fire protection impacts and ensure the provision of additional fire personnel and/or equipment as necessary to provide an acceptable level of fire protection services deemed acceptable by the Fire Department.

FINDINGS: Changes or alterations have been required in, or incorporated into, the project which avoid or substantially lessen the potentially significant environmental impacts as identified in the final Program EIR.

RATIONALE: The final Program EIR is a program EIR prepared pursuant to CEQA Guidelines Section 15168 and analyzing a series of separate projects contemplated as part of the continuing Restated and Amended Redevelopment Plan. Analysis prepared for specific projects will identify project-specific impacts and require implementation of mitigation measures. This identified mitigation measure will ensure that potential fire protection impacts are reduced to a level of less than significant.

IMPACT ON WASTEWATER SERVICE: The adoption and implementation of the Restated and Amended Redevelopment Plan could have significant wastewater collection or treatment impacts on wastewater collection and treatment facilities. The development of industrial, commercial and residential uses will generate additional quantities of wastewater that will have to be collected and treated at the Oakley-Bethel Island Wastewater Management Authority treatment plant.

MITIGATION: The City or Agency, as appropriate, in conjunction with the Ironhouse Sanitary District shall review all development projects to make sure adequate capacity exists at the wastewater treatment plant before projects are approved by the City or Agency, as appropriate.

FINDINGS: Changes or alterations have been required in, or incorporated into, the project which avoid or substantially lessen the potentially significant environmental impacts as identified in the final Program EIR.

RATIONALE: The final Program EIR is a program EIR prepared pursuant to CEQA Guidelines Section 15168 and analyzing a series of separate projects contemplated as part of the continuing Restated and Amended Redevelopment Plan. Analysis prepared for specific projects will identify project-specific impacts and require implementation of mitigation measures. The identified mitigation measure will ensure that potential wastewater service impacts are reduced to a level of less than significant.

IMPACT ON HAZARDS AND HAZARDOUS MATERIALS: The development of the DuPont Chemical property could pose potential hazardous material impacts. Remediation of hazardous materials from the soil and groundwater on the property has been ongoing for years. There are existing uses in the Project Area that have potential to have hazardous materials in the soil.

MITIGATION: The City or Agency, as appropriate, shall require the project applicant for any redevelopment project to submit proper documentation as necessary to assure the City or Agency, as appropriate, to its satisfaction that no contamination exists on the site or in the groundwater. Based upon the findings, the City or Agency, as appropriate, can require subsequent site assessments and/or remediation as required by all local, county, State and Federal laws and regulations prior to site grading or construction.

FINDINGS: Changes or alterations have been required in, or incorporated into, the project which avoid or substantially lessen the potentially significant environmental impacts as identified in the final Program EIR.

RATIONALE: The final Program EIR is a program EIR prepared pursuant to CEQA Guidelines Section 15168 and analyzing a series of separate projects contemplated as part of the continuing Restated and Amended Redevelopment Plan. Analysis prepared for specific projects will identify project-specific impacts and require implementation of mitigation measures. The identified mitigation measure will ensure that potential hazards and hazardous materials impacts are reduced to a level of less than significant.

IMPACT ON BIOLOGICAL RESOURCES: Additional development in the Project Area could increase habitat that supports Culex tarsalis mosquitoes resulting in a significant impact. Private development in the vicinity of the San Joaquin River could impact existing wetlands and other sensitive biological habitat along the river and in the northern section of Amendment Area 1.

MITIGATION: The City's Community Development Department and/or the Agency, as appropriate, shall submit any proposed development or infrastructure plans for Big Break Marina to U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers and California Department of Fish and Game prior to the start of construction to determine whether or not any permits from the respective resource agencies are required. The City or Agency, as appropriate, shall require proof that all necessary permits from the resource agencies as required by law have been obtained prior to the start of construction. The City or Agency, as appropriate, shall submit or require the submission of all projects to the Contra Costa Mosquito and Vector Control District for review to make sure the projects do not provide habitat for the Culex tarsalis mosquito. All feasible measures suggested by the Contra Costa Mosquito and Vector Control District to reduce and/or eliminate habitat for the Culex tarsalis mosquito shall be incorporated into the project.

FINDINGS: Changes or alterations have been required in, or incorporated into, the project which avoid or substantially lessen the potentially significant environmental impacts as identified in the final Program EIR.

RATIONALE: The final Program EIR is a program EIR prepared pursuant to CEQA Guidelines Section 15168 and analyzing a series of separate projects contemplated as part of the continuing Restated and Amended Redevelopment Plan. Analysis prepared for specific projects will identify project-specific impacts and require implementation of mitigation measures. The identified mitigation measure will ensure that potential impacts on biological resources are reduced to a level of less than significant.

IMPACT ON CULTURAL RESOURCES: The construction of projects in the area close to the San Joaquin River could impact existing archaeological resources that may be present. Since the area near the San Joaquin River is considered to have moderately sensitive archaeological areas, all future development in this area could have archaeological impacts.

MITIGATION: Implementation as required by the City or Agency, as appropriate, of the following measures associated with grading and construction of a site suspected of containing archaeological resources: Phase 1: Phase 1 shall consist of a qualified archaeologist doing a literature and records search, surface study, subsurface testing if necessary, the recordation of any sites, and a recommendation regarding the need for further work. Phase 2: If it is determined during Phase 1 that further work is necessary, it shall consist of the following: A qualified archaeological monitor shall be present at a pre-grading conference with the developer, grading contractor, and the environmental review coordinator. The purpose of this meeting will be to consult and coordinate the role of the archaeologist in the grading of the site. An archaeologist or designate shall be present during those relative phases of grading as determined at the pre-grading conference. The monitor shall have the authority to temporarily direct, divert or halt grading to allow recovery of fossil remains. The developer shall authorize the deposit of any resources found on the project site in an institution staffed by qualified archaeologist as may be determined by the Community Development Director. The contractor shall be aware of the random nature of archaeological resource occurrences and the possibility of a discovery of such scientific and/or educational importance that might warrant a long-term salvage operation or preservation. The Community Development Director shall resolve any conflicts regarding the role of the archaeologist and/or recovery times.

FINDINGS: Changes or alterations have been required in, or incorporated into, the project which avoid or substantially lessen the potentially significant environmental impacts as identified in the final Program EIR.

RATIONALE: The mitigations will ensure that measures to reduce potential impacts on archaeological resources will be carried out for project sites suspected to have archaeological resources present. By requiring these measures to be carried out, the mitigation will lessen the impact on cultural resources. With implementation of the mitigation measures listed, impacts on cultural resources will be reduced to a less than significant level.

IMPACT ON AGRICULTURAL RESOURCES: Public and private development in Amendment Area 1 could require the removal of the existing vineyards on the DuPont Chemical Company property and the Cline Vineyards property resulting in the conversion of agricultural land to urban use. The removal of the vineyards due to new development will further reduce agricultural crop production in the City. The conversion of agricultural land, although zoned for industrial use, could have a significant impact on agricultural resources.

MITIGATION: The City or Agency, as appropriate, shall assure the retention of a minimum of 15 acres of the existing vineyards on the Cline Vineyards property. The 15 acres shall include a minimum of 10 acres of the existing vines that are over 80 years old if the health of the vines justifies their preservation. If the 80-year old vines are not in good health as determined by a person experienced in grape vines, the minimum 15 acres can consist of other vines on either the Cline Vineyard or Du Pont property. The City or Agency, as appropriate, shall assure the preservation of the 15 acres of vineyards for a minimum of ten years from the date of preservation.

FINDINGS: Changes or alterations have been required in, or incorporated into, the project which avoid or substantially lessen the potentially significant environmental impacts as identified in the final Program EIR.

RATIONALE: The mitigations will ensure that measures to reduce potential impacts on agricultural resources will be carried out. By requiring these measures to be carried out, the mitigation will lessen the impact on agricultural resources. With implementation of the mitigation measures listed, impacts on agricultural resources will be reduced to a less than significant level.

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EXHIBIT B

Less than Significant Environmental Impacts

The City Council finds that all other impacts of the proposed project are not environmentally significant as documented in the final Program EIR and supported by evidence elsewhere in the record. In some cases, the final Program EIR suggests mitigations for impacts that are less than significant even without mitigation. CEQA does not require mitigation for less than significant impacts, nor does it require findings for mitigation measures proposed for less than significant impacts, therefore, no findings are made with respect to such mitigation measures. The City Council has determined that the final Program EIR is correct in all those instances where it states that impacts are less than significant.

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EXHIBIT C

Findings Concerning Alternatives

The final Program EIR as certified identifies a significant impact which cannot be reduced to less than significant through the application of mitigation measures. Where mitigation measures are not identified to avoid significant environmental impacts, the City Council as responsible agency must review the final Program EIR project alternatives to determine if any feasible alternatives will avoid the unmitigated impacts. The City Council hereby finds that the alternatives analyzed in the final Program EIR will not avoid the unmitigated significant impacts and/or are not feasible for the specific economic, social, or other considerations set forth below pursuant to CEQA Section 21081 and the CEQA Guidelines.

The following is the project's unmitigated significant impact:

> AIR QUALITY IMPACT: The construction and operation of projects pursuant to the proposed Restated and Amended Redevelopment Plan will have air emission impacts. The Restated and Amended Redevelopment Plan could indirectly have significant adverse air quality impacts by funding and assisting in the construction of projects that exceed air emission thresholds and emit ozone in a basin that is non-attainment.

Project alternatives are identified and analyzed in the final Program EIR Section 7.0. They include the No Project alternative, the Alternative Financing alternative, and the Change the Project Area alternative. As reflected in the final Program EIR analyses, none of the project alternatives would eliminate the significant unavoidable impacts identified for the project.

<u>No Project Alternative</u>. This alternative would consist of the Restated and Amended Redevelopment Plan not being adopted and implemented. The existing Redevelopment Plan would remain in effect. However, the City Council finds the No Project alternative infeasible because it would not achieve the City Council' objectives for the project. This alternative would not provide for the planning and implementation of activities to revitalize the Project Area (both the Original Project Area and the Added Project Area), would not establish a financing method to fund the activities, and would not allow the upgrading and development of public and private projects, including civic and recreational areas, to redevelop the Project Area. Moreover, it would not meet any of the project objectives for the Added Project Area, including revitalizing the area, encouraging development of new commercial and industrial uses, and improving infrastructure. In addition, social, economic and other considerations make the No Project alternative infeasible.

<u>Alternative Financing Alternative</u>. This alternative would consist of not providing for financing of projects and programs and not amending financing limits as outlined in the proposed

Restated and Amended Redevelopment Plan. The City Council finds this alternative infeasible because it would not achieve the City Council's objectives for the project. This alternative would not provide for the planning and implementation of activities to revitalize the Project Area (both the Original Project Area and the Added Project Area), would not establish a financing method to fund the activities, and would not allow the upgrading and development of public and private projects, including civic and recreational areas, to redevelop the Project Area. Moreover, it would not meet any of the project objectives for the Added Project Area, including revitalizing the area, encouraging development of new commercial and industrial uses, and improving infrastructure. In addition, social, economic and other considerations make the Alternative Financing alternative infeasible.

Change the Project Area Alternative. This alternative would increase the size of the proposed Added Project Area, decrease the size of the proposed Added Project Area, and/or eliminate the extension of the debt and time limits in the Redevelopment Plan. Alternative configurations of the proposed Added Project Area were considered, but were rejected because other areas or locations would not meet project criteria for designation as redevelopment project areas and/or would not accomplish project objectives, and the proposed Added Project Area does meet project criteria for designation as a redevelopment project area and would accomplish project objectives. Eliminating the extension of the debt and time limits in the Redevelopment Plan would also not achieve the City Council's objectives for the project. The City Council finds this alternative infeasible because it would not achieve the City Council's objectives for the project. This alternative would not provide for the planning and implementation of activities to revitalize the Project Area (both the Original Project Area and the Added Project Area), would not establish a financing method to fund the activities, and would not allow the upgrading and development of public and private projects, including civic and recreational areas, to redevelop the Project Area. Moreover, it would not meet any of the project objectives for the Added Project Area, including revitalizing the area, encouraging development of new commercial and industrial uses, and improving infrastructure. In addition, social, economic and other considerations make the Change the Project Area alternative infeasible.

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EXHIBIT D

Statement of Overriding Considerations

Pursuant to CEQA Guidelines Section 15093, the City Council makes the following Statement of Overriding Considerations.

The City Council has balanced the benefits of the proposed Restated and Amended Redevelopment Plan against the adverse impact identified in the final Program EIR as significant and potentially significant that has not been eliminated or mitigated to a level of insignificance.

The City Council, acting pursuant to CEQA Guidelines Section 15093, hereby determines that the benefits of the project outweigh the unmitigated adverse impact and the project should be approved.

The City Council has carefully considered each impact in reaching its decision to approve the project. The Restated and Amended Redevelopment Plan will eliminate areas of blight within the City and improve commercial, residential and industrial areas of the City. The City Council specifically finds that to the extent that the identified adverse or potentially adverse impact has not been mitigated to acceptable levels, there are specific economic, social, environmental, land use, and other considerations which support approval of the Restated and Amended Redevelopment Plan. Similarly, if any identified adverse or potentially adverse impact is not mitigated to insignificant levels, notwithstanding adopted findings that it is so mitigated, any residual impact is acceptable for specific economic, social, environmental, land use, and other considerations set forth below. The City Council further finds that any one of the overriding considerations identified hereinafter is sufficient basis to approve the project as mitigated.

The following unavoidable significant environmental impact is associated with the proposed project as identified in the final Program EIR:

> AIR QUALITY IMPACT: The construction and operation of projects pursuant to the proposed Restated and Amended Redevelopment Plan will have air emission impacts. The Restated and Amended Redevelopment Plan could indirectly have significant adverse air quality impacts by funding and assisting in the construction of projects that exceed air emission thresholds and emit ozone in a basin that is non-attainment.

The City Council has considered the public record of proceedings on the proposed project and determines that the approval and implementation of the project would result in the following substantial public benefits:

Social Considerations:

Substantial evidence exists in the record demonstrating the social benefits which would be derived from adoption and implementation of the Restated and Amended Redevelopment Plan. Specifically, the Restated and Amended Redevelopment Plan will:

a. Facilitate the development and redevelopment of blighted and underutilized properties in the Project Area (Original Project Area and Added Project Area).

b. Preserve and upgrade housing in the Project Area, as well as implement policies encouraging development of low and moderate income housing.

c. Provide public facilities and improvements in the Project Area.

Economic Considerations

Substantial evidence exists in the record demonstrating the economic benefits which would be derived from adoption and implementation of the Restated and Amended Redevelopment Plan. Specifically, the Restated and Amended Redevelopment Plan will provide tax increment financing to improve underutilized areas in the City. Such activities will improve property values throughout the Project Area.

Other Considerations

Substantial evidence exists in the record demonstrating other benefits which would be derived from adoption and implementation of the Restated and Amended Redevelopment Plan. Specifically, they include provision of public improvements to improve circulation and infrastructure in the Project Area, rehabilitation of existing parcels and development of vacant parcels in the Project Area, and comprehensive planning efforts that will encourage removal of incompatible uses and development of underutilized and blighted properties. A key consideration in adopting the Restated and Amended Redevelopment Plan is to redevelop the DuPont Chemical Company site, which is located in an area of the City which is planned for commercial and industrial uses. This property, which is designated in the City's General Plan for industrial development, is currently blighted and requires substantial public infrastructure improvements to allow development in accordance with the City's General Plan. Without Agency assistance, this blighted property will remain underutilized and underdeveloped.

EXHIBIT E

Mitigation Monitoring and Reporting Program

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OAKLEY REDEVELOPMENT PLAN AMENDMENT MITIGATION MONITORING AND REPORTING PROGRAM

Prepared for:

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October 2001

Laguna Pacific
ENVIRONMENTAL

MITIGATION MONITORING and REPORTING PROGRAM

INTRODUCTION

This document constitutes the Mitigation Monitoring and Reporting Program (MMRP) for the proposed Oakley Redevelopment Plan Amendment. It has been prepared pursuant to the requirements of Public Resources Code §21081.6 which, among other things, states that when a governmental agency adopts or certifies a CEQA document that contains the environmental review of a proposed project, "The public agency shall adopt a reporting or monitoring program for the changes made to the project or conditions of project approval, adopted in order to mitigate or avoid significant effects on the environment. The reporting or monitoring program shall be designed to ensure compliance during project implementation."

This MMRP includes the following information in a matrix format: (1) the environmental topical issue, (2) mitigation measures that would either eliminate or lessen the potential impact from the project, (3) the monitoring milestone or phase during which the measure should be complied with or carried out (4) the department responsible for monitoring mitigation measure compliance, and (5) a place where the monitoring agency can provide verification of compliance by providing the dated initials of an authorized agency representative.

OAKLEY REDEVELOPMENT PLAN AMENDMENT
MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measure No.	Mitigation Measures	Monitoring Milestone	Department with Implementation Monitoring Responsibility	Verification of Compliance (Responsible Monitor to Initial and Date)
	GEOLOGY/SOILS			
1.	The City or Agency, as appropriate, shall review all development plans for potential soil erosion impacts and require the incorporation of all applicable soil erosion prevention measures deemed appropriate by the City Engineer into projects as applicable to minimize soil erosion during project construction and the life of the project.	During plan check and project review and prior to issuance of grading or building permits, whichever is issued first.	Community Development Department of City	Initial Date
2.	The City or Agency, as appropriate, shall review all development plans for potential grading impacts and require changes to projects as necessary to minimize mass grading.	During grading plan check and project review and prior to a grading permit.	Community Development Department of City	Initial Date
	HYDROLOGY/DRAINAGE AND WATER			
1.	All development projects as determined by the City's Community Development Department shall prepare a preliminary hydrology study to determine whether or not the existing storm drain system serving the project has capacity to handle the runoff from the site.	During grading plan and storm drain plan check and prior to issuance of grading or building permits, whichever is issued first.	Community Development Department of City	Initial Date
2.	All projects shall comply with all applicable NPDES requirements and when necessary incorporate all applicable surface water pollution control measures to reduce or eliminate urban pollutants from entering local surface waters.	During grading plan check and prior to issuance of grading or building permits, whichever is issued first.	Community Development Department of City	Initial Date

Mitigation Measure No.	Mitigation Measures	Monitoring Milestone	Department with Implementation Monitoring Responsibility	Verification of Compliance (Responsible Monitor to Initial and Date)
3.	All development projects within one-quarter mile of the Contra Costa Canal shall be submitted to the Contra Costa Water District for review and approval prior to the issuance of a grading or building permits. Land Rights Permits shall be obtained from Contra Costa Water District prior to the construction of any projects or storm drain improvements within the canal right-of-way.	During grading plan check and prior to issuance of grading or building permits, whichever is issued first.	Community Development Department of City	Initial Date
	TRAFFIC AND CIRCULATION			
1.	The City or Agency, as appropriate, shall review all projects for potential traffic and circulation impacts, including safety and congestion, when submitted for approval. A traffic analysis shall be prepared to evaluate the potential traffic and circulation impacts when the City or Agency, as appropriate, determines a project could have significant traffic or circulation impacts.	During project review and prior to project approval.	Community Development Department of City	Initial Date
2.	The City or Agency, as appropriate, shall review all projects to change, modify or incorporate measures accordingly to reduce identified significant traffic and circulation impacts to a level of less than significant.	During project review and prior to project approval.	Community Development Department of City	Initial Date
	AESTHETICS			
1.	The Oakley Redevelopment Area Planned Unit District shall be amended to include the Added Project Area being added to the Oakley Redevelopment Project Area by the Amendment.	Prior to the approval of any Agency sponsored projects.	Community Development Department of City	Initial Date
2.	Upon evaluation of specific redevelopment projects by the Agency or the City, as appropriate, if potential aesthetic impacts are determined to exist, the following measures shall be implemented where appropriate: Construction equipment staging areas and storage of materials shall be	During building plan check and prior to issuance of building permits.	Community Development Department of City	Initial

Mitigation Measure No.	Mitigation Measures	Monitoring Milestone	Department with Implementation Monitoring Responsibility	Verification of Compliance (Responsible Monitor to Initial and Date)
	required to be screened from public view or located in an area away from direct public view.			________ Date
3.	The City or Agency, as appropriate, shall review all projects for potential aesthetic impacts and if it is determined a project could have significant aesthetic impacts, proper measures as suggested by the City or Agency, as appropriate, to reduce impacts to a level of insignificance shall be incorporated into the project.	During project review and prior to project approval.	Community Development Department of City	________ Initial ________ Date
	NOISE			
1.	The City or Agency, as appropriate, shall review all projects for potential noise impacts and if it is determined a project could have significant noise impacts that do not comply with the Noise Element, proper measures as suggested by the City or Agency, as appropriate, to reduce noise levels in compliance with the City's Noise Element shall be incorporated into the project.	During project review and prior to project approval.	Community Development Department of City	________ Initial ________ Date
	AIR QUALITY			
1.	All projects shall be reviewed by the City or Agency, as appropriate, for potential air quality impacts.	During project review and prior to project approval.	Community Development Department of City	________ Initial ________ Date
2.	The City or Agency, as appropriate, shall incorporate all applicable air emission reduction measures to reduce air emissions to comply with air emission thresholds adopted by the BAAQMD. In addition, the City or Agency, as appropriate, shall incorporate new short and long-term air emission reduction measures in the future as applicable to further reduce project air emissions.	During project review and prior to project approval.	Community Development Department of City	________ Initial ________ Date

Mitigation Measure No.	Mitigation Measures	Monitoring Milestone	Department with Implementation Monitoring Responsibility	Verification of Compliance (Responsible Monitor to Initial and Date)
	WATER SERVICE			
1.	• Require ultra low flow toilets that have a minimum 2-inch glazed trap-way and use 1.6 gal./flush. • Require low flow showerheads using a maximum of 2.5 gal/min. and have a manual shut-off valve that can be used to further reduce water flow. • Require the use of aerators or laminar flow devices on kitchen and lavatory faucets to reduce the maximum flow to 1.6 gal./min. • Encourage the use of high-efficiency washing machines. • Require that new homes with water pressure in excess of 70 psi be required to install pressure-reducing valves set at 60 psi. • Encourage the installation of hot water heater recirculation pumps with time clocks to reduce the amount of water wasted while waiting for hot water. • Encourage the installation of high-efficiency dishwashers • Require that all hot water pipes be insulated. • Prohibit gutter flooding. • Prohibit single-pass cooling systems. • Prohibit non-recirculating systems in new car washes. • Prohibit non-recirculating systems in all decorative fountains. • Require that irrigation systems for all new landscaping be connected to automatic timers. • Require that at least 90 percent of plants in non-turf areas be drought resistant. • Require that non-drought tolerant plants be grouped together and irrigated separately. • Require that a minimum of 2-inches of mulch be added to the soil surface after planting. • Require that sprinkler systems be designed to provide minimum runoff and over spray onto non-irrigated areas and that they not be used in areas less than eight feet wide. • Require that developers provide new home buyers with landscaping that complies with Water Conservation Landscaping Article 82-26-2.	During building plan check and prior to issuance of building permits.	Community Development Department of City	____ Initial ____ Date

Mitigation Measure No.	Mitigation Measures	Monitoring Milestone	Department with Implementation Monitoring Responsibility	Verification of Compliance (Responsible Monitor to Initial and Date)
	POLICE PROTECTION			
1.	The City or Agency, as appropriate, shall review all development projects for police protection impacts and ensure the provision of additional police personnel and/or equipment as necessary to provide an acceptable level of police protection services deemed acceptable by the Oakley Police Department.	During project review and prior to project approval.	Police Department	Initial Date
	FIRE PROTECTION			
1.	The City or Agency, as appropriate, shall review all development projects for fire protection impacts and ensure the provision of additional fire personnel and/or equipment as necessary to provide an acceptable level of fire protection services deemed acceptable by the Oakley Fire Department.	During project review and prior to project approval.	Fire Department	Initial Date
	WASTEWATER SERVICE			
1.	The City or Agency, as appropriate, in conjunction with the Ironhouse Sanitary District shall review all development projects to make sure adequate capacity exists at the wastewater treatment plant before projects are approved by the City or Agency, as appropriate.	During project review and prior to project approval.	Community Development Department of City	Initial Date
	HAZARDS AND HAZARDOUS MATERIALS			
1.	The City or Agency, as appropriate, shall require the project applicant for any redevelopment project to submit proper documentation as necessary to assure the City or Agency, as appropriate, to its satisfaction that no contamination exists on the site or in the groundwater. Based upon the findings, the City or Agency, as appropriate, can require subsequent site assessments and/or remediation as required by all local, county, State and Federal laws and regulations prior to site grading or construction.	During project review and prior to project approval.	Community Development Department of City	Initial Date

Mitigation Measure No.	Mitigation Measures	Monitoring Milestone	Department with Implementation Monitoring Responsibility	Verification of Compliance (Responsible Monitor to Initial and Date)
	BIOLOGICAL RESOURCES			
1.	The City's Community Development Department and/or the Agency, as appropriate, shall submit any proposed development or infrastructure plans for Big Break Marina to U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers and California Department of Fish and Game prior to the start of construction to determine whether or not any permits from the respective resource agencies are required. The City or Agency, as appropriate, shall require proof that all necessary permits from the resource agencies as required by law have been obtained prior to the start of construction.	During plan check and prior to the issuance of grading or building permits, whichever occurs first.	Community Development Department of City	Initial Date
2.	The City or Agency, as appropriate, shall submit or require the submission of all projects to the Contra Costa Mosquito and Vector Control District for review to make sure the projects do not provide habitat for the *Culex tarsalis* mosquito. All feasible measures suggested by the Contra Costa Mosquito and Vector Control District to reduce and/or eliminate habitat for the *Culex tarsalis* mosquito shall be incorporated into the project.	During plan check and prior to the issuance of grading or building permits, whichever occurs first.	Community Development Department of City	Initial Date
	CULTURAL RESOURCES			
1.	Implementation as required by the City or Agency, as appropriate, of the following measures associated with grading and construction of a site suspected of containing archaeological resources: Phase 1: Phase 1 shall consist of a qualified archaeologist doing a literature and records search, surface study, subsurface testing if necessary, the recordation of any sites, and a recommendation regarding the need for further work. Phase 2: If it is determined during Phase 1 that further work is necessary, it shall consist of the following:	During project review and prior to project approval and on-going during project grading and construction.	Community Development Department of City	Initial Date

Mitigation Measure No.	Mitigation Measures	Monitoring Milestone	Department with Implementation Monitoring Responsibility	Verification of Compliance (Responsible Monitor to Initial and Date)
	A qualified archaeological monitor shall be present at a pre-grading conference with the developer, grading contractor, and the environmental review coordinator. The purpose of this meeting will be to consult and coordinate the role of the archaeologist in the grading of the site. An archaeologist or designate shall be present during those relative phases of grading as determined at the pre-grading conference. The monitor shall have the authority to temporarily direct, divert or halt grading to allow recovery of fossil remains. The developer shall authorize the deposit of any resources found on the project site in an institution staffed by qualified archaeologist as may be determined by the Community Development Director. The contractor shall be aware of the random nature of archaeological resource occurrences and the possibility of a discovery of such scientific and/or educational importance that might warrant a long-term salvage operation or preservation. The Community Development Director shall resolve any conflicts regarding the role of the archaeologist and/or recovery times.			
	AGRICULTURAL RESOURCES			
1.	The City or Agency, as appropriate, shall assure the retention of a minimum of 15 acres of the existing vineyards on the Cline Vineyards property. The 15 acres shall include a minimum of 10 acres of the existing vines that are over 80 years old if the health of the vines justifies their preservation. If the 80-year old vines are not in good health as determined by a person experienced in grape vines, the minimum 15 acres can consist of other vines in either the Cline Vineyard or Du Pont property.	During project review and prior to project approval.	Community Development Department of City	________ Initial ________ Date
2.	The City or Agency, as appropriate, shall assure the preservation of the 15 acres of vineyards for a minimum of ten years from the date of preservation.	During project approval and on-going for ten years after the vineyards are preserved.	Community Development Department of City	________ Initial ________ Date

Appendix M

DuPont Phase II Environmental Assessment

VOLUME II

ENVIRONMENTAL ASSESSMENT
VINEYARD AREA BUFFER ZONE
DUPONT ANTIOCH WORKS
ANTIOCH, CALIFORNIA

Prepared for
DuPont Specialty Chemicals
Corporate Remediation Group
Barley Mill Plaza, Building 27
P.O. Box 80027
Wilmington, Delaware 19880

May 14, 1999

URS Greiner Woodward Clyde

500 12th Street, Suite 200
Oakland, California 94607

[illegible]

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May 7, 1999
40D6AN8078.99

Mr. Michael U. DeStefano
DuPont Specialty Chemicals
Corporate Remediation Group
Barley Mill Plaza, Building 27
P.O. Box 80027
Wilmington, DE 19880

Subject: **Phase II Environmental Assessment of the DuPont Antioch Works Plant Buffer Zone Area, Antioch, California**

Dear Mr. DeStefano:

We are pleased to present our Phase II Environmental Assessment report for the DuPont Antioch Works Buffer Zone area located in Antioch, California. This study was prepared in accordance with the scope of work in our agreement dated November 11, 1998. Mr. Marco Lobascio and Ms. April Ann Giangerelli assisted in the preparation of this report.

This report summarizes the findings and our conclusions and recommendations regarding the potential for a significant concern at this site. Please call if you have any questions.

Sincerely,

URS Greiner Woodward Clyde

Albert P. Ridley, C.E.G.
Project Manager

April A Giangerelli

April Ann Giangerelli
Staff Environmental Engineer

Attachment: Phase II ESA Report

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FINAL REPORT

PHASE II
ENVIRONMENTAL ASSESSMENT
VINEYARD AREA BUFFER ZONE
DUPONT ANTIOCH WORKS
ANTIOCH, CALIFORNIA

Prepared for
DuPont Specialty Chemicals
Corporate Remediation Group
Barley Mill Plaza, Building 27
P.O. Box 80027
Wilmington, Delaware 19880

May 7, 1999

URS Greiner Woodward Clyde
500 12th Street, Suite 200
Oakland, California 94607

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Appendices

1.1 INTRODUCTION

This report presents the findings of the Phase I and II site characterization of soil and groundwater conditions at the DuPont Antioch Plant Buffer Zone site located at 6000 Bridgehead Road, Antioch, California (hereafter referred to as the site, or the Vineyard Property). URS Greiner Woodward Clyde (URSGWC) performed the site characterization work in accordance with the Work Plan (URSGWC 1998a) and the Health and Safety Plan (URSGWC 1998b) submitted to the Contra Costa County Health Services Agency (the County) on November 11, 1998. Mr. Les Miyashiro, Senior Environmental Health Specialist at the County, approved the Plans and issued a well installation permit on November 11, 1998.

The purpose of the site characterization activities was to evaluate if soil and groundwater conditions may be of concern regarding protection of human health and the environment based on long-term exposure to low-levels of contaminants. Considering that in the future the site may be sold, the results of this evaluation will be used to support decisions about the need (if any) and extent of further characterization and/or remedial actions depending on the future use of the site. It is our understanding, however, that the use of the site will remain agricultural for the foreseeable future.

The site characterization activities described in this report involved:

1) record search and preparation of the field exploration work plan,
2) field exploration to collect soil and shallow groundwater samples,
3) laboratory analysis of the samples collected and QA/QC of the results, and
4) data interpretation and reporting.

As part of the record search activity, URSGWC interviewed DuPont staff to gather information about historical site chemicals usage. Mr. Albert Ridley, Mr. James Strandberg, and Mr. Brian Johnson performed a site reconnaissance on August 20, 1998. Mr. Mike DeStefano provided information regarding site history during that visit. URSGWC did a computerized record search of sites listed in the regulatory agencies databases within one mile of the property. The results of the record search activities are in Section 1.3. The field exploration work plan (URSGWC 1998a) was developed based on these results.

The field exploration sampling activities were conducted between November 17 and 23, 1998. Figure 2 shows the sampling locations. A total of 14 borings were drilled using a truck-mounted pneumatically powered drill rig to collect soil and groundwater samples. The soil samples were collected from a depth of 0 to 3 feet. A grab groundwater sample was collected from each of the borings. Section 2.1 describes the field exploration activities.

The results of the laboratory analyses performed on the samples are presented in Section 2.2. The samples were analyzed for TPH-diesel and BTEX, VOCs, SVOCs, PCBs, Organochlorine Pesticides, Pesticides/Herbicides, and Title 22 metals.

Section 3.0 presents the results of the data evaluation activity. Conclusions and recommendations are in Section 4.0. References are in Section 5.0. Appendix A contains the boring logs. Analytical laboratory reports are in Appendix B. The EDR report is in Appendix C.

1.2 SITE HISTORY AND ENVIRONMENTAL SETTING

The site consists of about two hundred acres of property that were acquired adjacent to the E.I. DuPont de Nemours Antioch Works Plant (the plant) to serve as a buffer zone. The site (see Figure 1) is located approximately 60 miles east of San Francisco, in Contra Costa County near the city of Antioch, California. The plant, built in 1955, began production of tetraethyl lead (TEL) and *Freon®* in 1957, and production of titanium dioxide was added in 1963. The Buffer Zone area has historically been used for agriculture, including an almond orchard and a vineyard. A farmhouse exists on the site, and the occupant of the house tends to the vineyard. The site is crossed by the Atchison Topeka and Santa Fe rail line (Figure 1).

The site is bounded to the north by the DuPont Antioch Plant, to the south by State Route 4, to the west by State Highway 160 and Bridgehead Road, and to the east by Big Break Road (see Figure 1). The site elevation is about 21 feet above mean sea level north of the Atchison Topeka and Santa Fe rail line, and slopes southwestward to about 10 feet above mean sea level. The regional geology is representative of a high-energy fluvial depositional environment. Soil borings recently drilled at the Antioch Works plant confirm the presence in the area of a series of upward fining sequences associated with fluvial deposition. Highly organic peats and muds are encountered near ground surface in some of the low-lying areas closer to the San Joaquin River. Site conditions are consistent with this depositional environment, and consist of a predominantly permeable section of alluvium ranging from 100 to 140 feet thick overlying the massively bedded (200-300 feet thick beneath site) silty clay Montezuma Formation.

This alluvial aquifer unit is divided into three local units at the site denoted as surficial, upper, and lower aquifers. The units of interest for the site investigation are the surficial and the upper aquifers. Groundwater flow direction in these aquifers is generally to the northeast (Figure 1). The surficial groundwater bearing zone is unconfined and is encountered at depths of 1 to 15 feet below ground surface (bgs). This surficial unit consists of fine- to medium-grained dune sands. A confining layer between the surficial and the upper units is found at 10 to 20 feet bgs, and consists of silty clay. The upper aquifer extends to 50 feet bgs.

1.3 SUMMARY OF RECORD SEARCH RESULTS

A search of computerized listings of available environmental records was performed by Environmental Data Resources, Inc. (EDR) of sites within the search distances specified by ASTM E-1527-97. A copy of the EDR report, with maps, is attached. The E.I. DuPont de Nemours Antioch Works Plant, located at 6000 Bridgehead Road, appears on a number of listings. That facility is in the process of closing operations. It was listed as an area with active underground storage tanks and a large quantity hazardous waste generator, and is listed under the SLIC program by the California Regional Water Quality Control Board. Studies and remedial activities are underway at the Plant due to the presence of VOCs and organic lead in the subsurface. The plant is located slightly upgradient and cross-gradient of the western corner of the eastern vineyard. A summary of the search results is provided below.

Sites Within a 1/2 Mile Radius

As shown on the Overview Map in Appendix C, there are only three sites within 1/2 mile of the property that are in the general upgradient direction from the Vineyard Property.

Site No. 12. Bonanza Industries. This site is located on Highway 4 near Bridgehead Road. There are no details in the EDR report for the California Hazardous Material Incident Report System listing of this site. Neither the type of chemical, the date, nor the quantity released is shown. There appears to be a low potential for impacts to the Vineyard Property, since no further actions are listed.

Site No. 14. Chevron 5433 Neroly Road. This site is a gas station that had a reported gasoline release in 1988. The Central Valley Regional Water Quality Control Board last reviewed the case in 1997. The case status is listed as "Preliminary Site Assessment Underway," and the case type as "Aquifer Affected". Because the Chevron site is located several hundred feet upgradient from the Vineyard Property, there is a relatively low potential for impacts to the Vineyard Property.

Site No. 15. Peckham Property 3215 E. 18th Street. This site is listed as a leaking underground gasoline tank with a classification as "Soil Only". It was signed off by the Central Valley Regional Water Quality Control Board on January 27, 1997 with the note "Remedial Action Completed or Deemed Unnecessary." Considering also that the Peckham Property is located slightly cross-gradient and upgradient and about 1/4 mile west of the site, there is a very low potential for impacts to the Vineyard Property.

Site No. 16. Big Break Marina. This site is a leaking underground tank site north of the Vineyard Property, in the downgradient direction. Therefore, a very low potential for impact is expected.

Sites Within a 1/2 and 1-Mile Radius

Site No. 16. Big Break Marina. The site is described as a gasoline tank site characterized in 1992. On the last review date of November 14, 1997, it had a status of "Signed Off, Remedial Action Completed or Deemed Unnecessary." This site is located northeast of the Vineyard Property, downgradient of the property. Therefore, a low potential for impacting the Vineyard Property is expected.

Site No. 18. Oakley Road Metering Site. This site is located about 1-mile to the Southwest and is the location of routine gas condensate operations and storage of gas pipeline equipment. Reported contaminants in groundwater include benzene, toluene, xylenes, and ethylbenzene. The Contra Costa County Health Services Department is providing oversight of investigation activities at this site. Because this site is located one mile away in the upgradient direction from the property, there is a low potential for impact to the Vineyard Property.

Well Listings

State Oil/Gas Wells. There are no listings of State oil or gas wells within the 2-mile search distance from the site.

Public Water Supply Systems. There is one listing located 1-2 miles to the east for Bridgehead Rentals SWS, at 5540 Highway 4, Oakley, California.

Federal Wells. One Federal Database Information well is shown at the south boundary of the Vineyard Property adjacent to Highway 4, as shown on the map in the EDR report. The depth to groundwater is reported as 14 feet in this well.

State Wells. One State Database Information well is shown about 1/4 mile west of the Vineyard Property, and west of Bridgehead Road.

Conclusions

Based upon our review of known sites with leaking underground storage tanks or hazardous materials releases, there is a low potential for the site to be impacted from off-site sources. Most of the reported sites are either greater than 1/2- mile from the site or are located downgradient of the site. The nearest upgradient site, the Chevron Station at 5433 Neroly Road, is located several hundred feet from the Vineyard Property. A study of petroleum plumes by Lawrence Livermore National Laboratory (1995) indicates that natural attenuation of petroleum in groundwater limits the likely extent of a petroleum groundwater plume to about 200 to 300 feet. The DuPont Plant is located slightly upgradient and cross-gradient of the northwestern corner of the eastern vineyard, and there is a low potential for impacts to the groundwater beneath the Vineyard Property.

2.1 SUMMARY OF FIELD INVESTIGATION ACTIVITIES

This section describes the field sampling activities performed at the site between November 17 and November 23, 1998. Figure 2 shows the soil and groundwater sampling locations. A total of 14 soil borings were drilled to collect soil and groundwater samples using a truck-mounted pneumatically powered drill rig. An additional six soil borings were proposed in the Work Plan, four borings in the southern vineyard and two borings in the eastern vineyard. As a result of difficulties in obtaining water samples in the southern vineyard due to drier wells, it was decided that the five borings drilled were sufficient for investigative purposes. The two borings in the eastern vineyard were evaluated in the field as redundant due to their proximity to other borings drilled in the area. The borings were drilled to a depth of about 10 feet below the first encounter with water. The soil samples were collected at a depth of 0 to 3 feet. A grab groundwater sample was collected from each of the borings.

The sampling locations were selected to provide information about the distribution of chemicals in the site subsurface and to compare detected concentrations with soil and groundwater quality criteria. A boring was drilled for approximately every 14 acres on the 200 acre site, and soil and groundwater samples were collected at each boring. Boring 1 was located at the western edge of the site, near an off-site automobile salvage yard. Boring 2 was located on the southern edge of the site, downgradient of the former gas station on Highway 4. Borings 5, 8 and 9 were located along the southern boundary of the property, near Highway 4. Borings 10 and 12 were drilled downgradient of the Atchison Topeka and Santa Fe rail line. Boring 11 was located at the southeastern corner of the site, downgradient of a nitrogen gas transmission facility. Boring 16 was located near the farmhouse, downgradient of a former underground storage tank, which was removed in 1998. The remaining Borings 13, 14, 15, 17 and 19, were placed randomly within the eastern area of the vineyard, north of the Atchison Topeka and Santa Fe rail line.

Samples from each location were labeled with a series of letters and numbers to identify the project site, i.e., Antioch (ANT), the matrix type, i.e., soil (S) or groundwater (G), the area of the investigation, i.e., Vineyard Divestiture (DV), and the location (1 through 19). Soil samples were collected in each of the 14 borings at a depth of approximately 0 to 3 feet. A total of 28 soil samples were collected, including 14 soil samples taken at 0 to 3 feet with the EnCore Sampler.

At each of the 14 boring locations, groundwater samples were collected at a depth of 16 to 25 feet. A total of 14 groundwater grab samples were collected using a clean Teflon™ tube and peristaltic pump.

During drilling, an Organic Vapor Meter (OVM) was used measure the presence of organic vapors in the airspace of the field personnel during drilling, and to perform field measurements of organic vapors from soil collected from the borings. Soil from the drive sampler was placed in a plastic bag, sealed and allowed to sit in the sun for about 5-10 minutes. The OVM was used to measure the presence of vapors inside the plastic bag, and these measurements were recorded on the log of each boring.

A site-specific Health and Safety Plan was developed for and followed by the personnel working on-site (Woodward-Clyde, 1998c). Sampling locations were carefully positioned away from utilities. Utility clearance was established with the assistance of Underground Services Alert (USA).

Fast-Tek Engineering Support Services of Point Richmond, California was retained as the drilling subcontractor. Borings were advanced using a truck-mounted pneumatically powered drill rig. Soil samples were collected in 2-inch diameter sample tubes within the drive sampler, and then placed into 125 mL and 500 mL laboratory-prepared glass jars. Head-space in the jars was minimized by packing the soil into the jars. The EnCore Sampler was used to collect soil samples intended for VOCs analysis using the SW-846 Method 5035. The EPA has approved use of the EnCore Sampler under SW-846 III, as an alternative sampling technique for short term sample storage followed by laboratory methanol preservation or other appropriate sample preparation (New Technologies, 1997). The EnCore Sampler has a smaller sampling tube in a T-handle that can be cored into the end of the 2-inch diameter sample tubes. Use of the EnCore Sampler eliminates the need for methanol or sodium bisulfate preservation in the field. The jars were sealed with teflon-lined jar caps, and labeled with the date, time, and sample name. Samples were then placed on ice in a cooler. Soil samples were shipped daily by Airborne Express to the laboratory under chain-of-custody procedures.

Groundwater samples were collected in 40 mL bottles preserved with H_2SO_4, 1000 mL bottles preserved with H_2SO_4, and 1000 mL unpreserved bottles. The bottles were sealed and labeled with the date, time, and sample name. Samples were then placed on ice in a cooler. Water samples were shipped daily by Airborne Express to the laboratory under chain-of-custody procedures.

A temporary PVC well casing was placed in Borings 12, 14 and 16 to allow for measurement of groundwater levels. The relative elevation of the top of the well casings was surveyed by Ronald Greenwell & Associates so that a general groundwater gradient could be estimated for the site. Each boring was backfilled with cement grout after groundwater sampling was completed.

Boring logs were compiled for each sampling location. The logs contain information pertaining to the USCS Soil Classification System, material description, OVM readings, start and end times, depth of first encounter with groundwater, groundwater level after 24 hours, and the total depth drilled. The logs also provide information on the drilling method, drill rig type, drill bit size, diameter of the hole, type of grout, and the sampler type. The boring logs can be found in Appendix A of this report.

2.2 ANALYTICAL RESULTS

This section describes the results of the laboratory analyses performed on the samples. Soil and groundwater samples were analyzed by Quanterra Inc. of Austin, Texas for TPH-diesel, TPH-motor oil and BTEX by EPA Method 8015; VOCs by EPA Method 8260B; SVOCs by EPA Method 8270C; PCBs by EPA Method 8082; Organochlorine Pesticides by EPA Method 8081; Pesticides/Herbicides by EPA Method 8081/8151 and Title 22 metals by EPA Method 6010B. The EnCore Sampler was used to collect the soil for VOCs analysis according to SW-846 Method 5035. The choice of analytical tests performed on the samples was based on the past and current agricultural use of the site, and its use as a buffer zone to the DuPont Plant. The same set of laboratory analyses was applied to each sample, in order to conduct an assessment of the overall environmental conditions of the site.

Soil Analytical Results

Table 2-1 presents the results of the laboratory analyses performed on the soil samples from the site. The table is organized by analysis type and sample number, and only those TPHs, VOCs, SVOCs, organochlorine pesticides, pesticides/herbicides and metals detected in at least one sample are listed on the table. Results above the detection limit are presented in bold type.

As shown in Table 2-1, none of the PCBs were detectable above laboratory reporting limits in any of the soil samples. Using EPA Method 8260, acetone was found in all but one of the 15 soil samples collected with the EnCore Sampler at concentrations ranging from 0.022 mg/kg to 0.14 mg/kg. Methylene chloride was found in two soil samples at concentrations of 0.012 mg/kg and 0.0063 mg/kg. TPH-diesel was detected in two samples at concentrations of 2.1 mg/kg and 2 mg/kg.

The following metals were found in nearly all 15 soil samples: arsenic, barium, chromium, cobalt, copper, lead, nickel, vanadium and zinc. Selenium was found in 2 soil samples at a concentration of 0.51 mg/kg. Arsenic, found in all of the samples, ranged in concentration from 1.4 mg/kg to 2.8 mg/kg.

Shallow Groundwater Analytical Results

Table 2-2 presents the laboratory analyses results for the shallow groundwater samples. The table is organized by analysis type and sample number, and only those metals and VOCs, with the exception of the BTEX compounds, detected in at least one sample are listed on the table. SVOCs, PCBs, organochlorine pesticides and pesticides/herbicides are grouped together in the table since there were no detections of any of these compounds in the soil samples. Results above the detection limit appear in bold type.

As shown in Table 2-2, none of the SVOCs, PCBs, organochlorine pesticides and pesticides/herbicides were detected in any of the water samples. TPH-diesel was detected in 12 of the 20 samples, at concentrations ranging from 0.059 mg/kg to 0.58 mg/kg. Toluene and xylene were both detected in Boring 19, at a concentration of 0.00089 mg/kg and 0.0019 mg/kg, respectively. Methylene chloride was detected in ten of the water samples, including all three of the equipment blanks and two trip blanks. Antimony and arsenic were detected in two of the equipment blanks, and iron was detected in one equipment blank.

2.3 DATA VALIDATION

The analytical results of the soil and groundwater samples collected on November 17 to 23, 1998 were reviewed and validated following QA/QC procedures for accuracy and applicability for the evaluation of site conditions. A total of 15 soil samples (one of which was a duplicate) and 14 groundwater samples were collected. In addition, 3 equipment blanks and 3 trip blanks were also analyzed. The review evaluated the following items:

- Holding times were checked for exceedences of prescribed extraction and analysis criteria.
- Equipment blanks, trip blanks and laboratory method blanks were reviewed to evaluate potential sample contamination.

- Matrix Spikes (MS), Matrix Spike Duplicates (MSD), Laboratory Control Samples (LCS) and Laboratory Control Sample Duplicates (LCSD) were reviewed to evaluate for analytical accuracy and precision.

The criteria for the evaluation were based on the USEPA's National Functional Guidelines for Organic and Inorganic Data Review (USEPA 1994).

Holding Time Review

The extraction and analysis holding time for each sample was reviewed for exceedances. No exceedances of method holding times were found.

Blank Review

Equipment, trip and laboratory method blank results were reviewed for detections of target analytes, which may indicate sample contamination. Blank samples are analyzed in the same manner as field samples. The equipment blank is prepared in the field using laboratory supplied "blank" distilled water, and is used to assess the potential for sample contamination as a result of sample collection, handling, storage and analysis. The trip blank is prepared by the laboratory and is brought but not opened in the field, and is used to assess the potential for sample contamination during sample handling and analysis. Laboratory method blanks consist of reagents specific to each individual analytical method that were prepared and analyzed by the laboratory to assess potential sample contamination within the laboratory.

TPH-diesel was detected in 2 equipment blanks, and methylene chloride was detected in all 3 of the equipment blanks and 2 trip blanks. The presence of methylene chloride, a common laboratory contaminant, in both the equipment and trip blanks is indicative of laboratory contamination. The presence of TPH-diesel in the equipment blanks may be due to inadequate equipment cleaning procedures. Iron, antimony and arsenic were also detected in the equipment blanks, also indicating inadequate equipment cleaning procedures.

MS/MSD, LCS/LCSD and Replicate Review

Matrix spike and matrix spike duplicate samples are prepared at the laboratory by dividing a control sample into two aliquots, then spiking each with identical concentrations of specific analytes. The spike samples are then analyzed separately and the results are compared to evaluate the effects of the sample matrix on the analytical accuracy and precision. Accuracy is assessed by calculating the relative percent recovery (RPR) and precision is assessed by calculating the relative percent difference (RPD). US EPA considers an RPR between 25% to 130%, and an RPD value less than 20% to be acceptable (USEPA, 1994).

Laboratory control sample (LCS) recoveries and duplicate relative percent differences (RPDs) were reviewed as a check for analytical accuracy and precision. The LCS is a known sample made by the laboratory for a specific analyte that is analyzed by the laboratory, and the percent recovery is compared to the original added amount of the analyte. The LCS is created by the laboratory by taking a control sample of soil/water and adding a specific analyte, analyzing it, and then comparing the percent recovery to the original analysis of the soil/water sample. Recoveries and RPDs for the different analytical methods can be found in the following table.

TABLE 2-3 QUALITY ASSURANCE/QUALITY CONTROL REVIEW

Compound	LCS Recovery (%)	LCSD Recovery (%)	RPD for LCSD Recovery (%)	MS Recovery (%)	MSD Recovery (%)	RPD for MSD Recovery (%)
EPA Method 6010B						
Metals in soil	91-103	--	--	**39**-119	**39**-104	0.65-7.6
Metals in water	91-106	--	--	91-107	91-109	0.03-3.2
Antimony in water	101	--	--	111	110	0.88
EPA Method 7470A/7471A						
Mercury in soil	96	--	--	87	96	8.9
Mercury in water	101	--	--	63-81	52-79	**3-19**
Mercury-dissolved	101	--	--	--	--	--
EPA Method 8015B						
Diesel Range Organics in Soil	66-99	--	--	89-103	90-110	1.5-6.2
Diesel Range Organics in Water	86-126	--	--	80-115	81-115	0.49-2.9
EPA Method 8081A						
Organochlorine Pesticides in Soil	70-103	--	--	51-65	50-66	1.4-2.6
Organochlorine Pesticides in Water	58-99	--	--	67-98	74-114	0.28-**19**
EPA Method 8151						
Pesticides/Herbicides in Soil	39-117	--	--	**5.4**-79	**6.5**-96	14-**49**
Pesticides/Herbicides in Water	48-78	--	--	61-77	62-70	1.7-9.3
EPA Method 8082						
PCBs in Soil	66-75	--	--	57-64	48-66	4-17
PCBs in Water	61-101	--	--	41-100	41-118	0.19-18
EPA Method 8260B						
VOCs in Soil	87-115	83-103	0.34-10	--	--	--
VOCs in Water	80-128	74-126	0-7.1	47-127	50-119	0.11-15
EPA Method 8270						
SVOCs in Soil	65-86	--	--	61-85	61-89	0.04-10
SVOCs in Water	43-99	--	--	52-98	35-100	0.33-**86**

Note: RPRs and RPD outside of laboratory control limits are bolded.

The LCS and MS recoveries for Method 6010, except for antimony in soil, were within laboratory control limits and indicate acceptable analytical accuracy and precision. Batch matrix spike and spike duplicate recoveries for antimony in soil were outside control limits, however laboratory control spike recoveries met acceptable criteria. Method 7470 for mercury in water had matrix spike and matrix spike duplicate recoveries outside the control limits, however associated laboratory control spike recoveries were within laboratory control limits.

All RPRs and RPDs for EPA Method 8015 were within laboratory control limits and indicate acceptable analytical accuracy and precision. The MS/MSD relative percent difference for EPA Method 8081 for dieldrin in water was out of laboratory control limits, however both recoveries were within control limits.

The MS recoveries for EPA Method 8260 exceeded the laboratory control limits for 1,1,2,2-tetrachloroethane, 4-methyl-2-pentanone, acetone, bromoform and trans-1,3-dichloropropene in water, however associated laboratory control spike recoveries were within control limits. The MSD recoveries for EPA Method 8260 exceeded the laboratory control limits for 4-methyl-2-pentanone, acetone and cis-1,2-dichloroethene in water. The MS/MSD RPD for EPA Method 8260 for trichlorethene in water was out of laboratory control limits, however both recoveries were within control limits. The MSD recovery for pentachlorophenol in water (EPA Method 8270) exceeded the laboratory control limits, but this does not affect the field data set since this analyte was detected only in one of the equipment blanks, and not in any of the field samples.

Laboratory replicates were prepared and analyzed. All replicate relative percent differences were within the precision acceptance range.

Overall QA/QC Assessment

The results of the QA/QC analysis for soil and water indicate acceptable levels of analytical precision and accuracy. However, the fact that methylene chloride was detected in several of the soil and groundwater samples, trip blanks and equipment blanks indicates laboratory contamination. TPH-diesel, iron, antimony and arsenic detections in the equipment blanks indicates that the tubing used for the peristaltic pump or the blank "distilled" water may have been contaminated. In general, if the detections in the field samples are less than five times the concentration detected in the equipment blank, then it may be assumed that the detections are due to equipment contamination. Antimony, arsenic and iron were not detected in any of the field groundwater samples, therefore there is no concern with these analytes. TPH-diesel was detected in 10 of the 14 groundwater samples, however the detections are less than five times the detected concentrations in the equipment blanks. Therefore, the detections of diesel in the groundwater do not appear to be a result of groundwater contamination at the site, but instead a result of equipment contamination. As a result of the QA/QC assessment, the TPH-diesel detections were excluded from the data evaluations.

This section describes the evaluation of the results of the sampling and analysis activities. The purpose of the site characterization activities was to evaluate if soil and groundwater conditions may be of concern regarding protection of human health and the environment based on long-term exposure to low-levels of contaminants. Considering that in the future the site may be sold, the results of this evaluation may be used to support decisions about the need (if any) and extent of further characterization and/or remedial actions depending on the future use of the site. It is our understanding, however, that the use of the site will remain agricultural for the foreseeable future.

3.1 APPROACH TO THE EVALUATION

For soil, the evaluation was based on comparing detected soil concentrations to the U.S. EPA Region 9 Preliminary Remedial Goals (PRGs). For groundwater, detected concentrations were compared to drinking water criteria.

The PRGs are conservative, non-site-specific, risk-based concentrations corresponding to a cancer risk of one-in-a-million or a unit (one) non-cancer hazard quotient for residential or commercial/industrial receptor exposure scenarios (USEPA 1998). The soil PRGs assume exposure to chemicals due to incidental ingestion, dermal contact, inhalation of particulate, and inhalation of vapor emissions into ambient air (VOCs only). For instance, a very conservative hypothesis of the soil PRGs is that there is and will be no barrier between the contaminated soil and the receptor. Due to their conservatism, the PRGs are used as screening-level criteria. If representative site concentrations do not exceed PRGs, and the site has been adequately investigated, no further action is generally warranted in terms of protection of human health. If PRGs are exceeded, a more refined, site-specific evaluation of potential risk may need to be performed.

For shallow groundwater, the maximum detected concentration was compared to the MCL (DTSC 1994), the AL (DTSC 1994), or the Region 9 Tap Water PRGs (USEPA 1998), in order of priority. The MCL and AL are state and/or federal drinking water standards. The Tap Water PRGs are drinking water concentrations corresponding to a cancer risk of $1x10^{-6}$ (one-in-a-million) or to a unit (1.0) non-cancer hazard quotient for a residential exposure scenario. The screening used the drinking water standards due to the lack of groundwater criteria for uses other than potable. This was done only to focus on the most important chemicals, and does not imply that the shallow groundwater at the site should be considered a viable source of drinking water. In case of significant exceedance of the stringent drinking water standards, a more refined evaluation of the potential uses of the shallow groundwater may be warranted to develop appropriate site-specific groundwater criteria that are protective of human health and the environment for the exposure scenarios corresponding to those uses.

3.2 EVALUATION OF SOIL ANALYTICAL RESULTS

Table 3-1 presents the comparison of detected soil concentrations to the PRGs. The maximum detected concentration was conservatively selected for the comparisons. Since TPH is a mixture of many hydrocarbons, a risk-based PRG is not available. Therefore, screening of detected TPH-diesel was performed by comparing detected concentrations of relevant TPH indicator compounds with their respective PRGs (ASTM 1995). As shown on the table, there were no exceedances of either residential or industrial soil PRGs.

3.3 EVALUATION OF SHALLOW GROUNDWATER ANALYTICAL RESULTS

Table 3-2 presents the comparison of the maximum detected groundwater concentration to water quality criteria. As shown on the table, carbon tetrachloride (CT) is the only chemical exceeding the drinking water standards. CT was detected once out of 14 samples at a concentration of 0.01 mg/l, exceeding the MCL of 0.0005 mg/l. This exceedance is evaluated to be of no concern to human health due to the low frequency and magnitude, and the fact that the shallow groundwater is not a viable source of drinking water.

The only plausible use of the shallow groundwater would be as a potential source of irrigation water for a small vegetable patch. In this case, chemicals present in irrigation water may be taken up by vegetables and fruits grown for human consumption. However, this exposure scenario is evaluated to be insignificant due to the low CT concentration and the fact that VOC compounds such as CT have a very low potential for accumulation in vegetables because of their high volatility and solubility. In addition, VOCs are in general easily metabolized by plants (Chaney, R., 1994; Doucette, W. J., et al., 1997).

Even in the unlikely case the shallow groundwater may be used as a drinking water source, the CT detection should be averaged with the 13 non-detects to obtain a concentration representing the overall site conditions. Conservatively assuming that the non-detects are all at the detection limit of 0.0005 mg/l, the average CT concentration is 0.0012 mg/l, exceeding the MCL of 0.0005 mg/l by a factor of about two. This exceedance is evaluated to be not of concern in terms of protection of human health.

The **CONCLUSIONS** of this study are the following:

- Based on the record search results, there is a low potential for impacts to the groundwater beneath the Vineyard Property from reported soil and groundwater contamination at the DuPont Plant because the plant is located slightly upgradient and cross-gradient of the northwestern corner of the eastern area of the Vineyard Property.
- Based on the record search results, there is a low potential for impacts to the groundwater beneath the Vineyard Property from reported upgradient hazardous materials releases and leaking underground tank sites, because the cases are either closed or the sites are located at a significant distance from the Vineyard Property.
- The distribution and magnitude of chemical concentrations detected in the soil samples, which did not significantly exceed conservative soil standards (the USEPA Region 9 PRGs), indicate that site soils do not warrant further consideration related to protection of human health.
- The distribution and magnitude of chemical concentrations detected in the shallow groundwater samples did not significantly exceed conservative drinking water standards (the MCLs), except for carbon tetrachloride (CT), which was detected only once out of 14 samples at a concentration of 0.01 mg/l, exceeding the MCL of 0.0005 mg/l.
- This exceedance is evaluated to be of no concern to human health due to the low frequency and magnitude, and the fact that the shallow groundwater is not a viable source of drinking water. The drinking water MCLs were used as screening criteria due to the lack of health based criteria for uses of the shallow groundwater other than as a potential potable water source.
- The only plausible use of the shallow groundwater would be as a potential source of irrigation water for a small vegetable patch. In this case, chemicals present in irrigation water may be taken up by vegetables and fruits grown for human consumption. However, this exposure scenario is evaluated to be insignificant due to the low CT concentration and the fact that VOC compounds such as CT have a very low potential for accumulation in vegetables because of their high volatility and solubility and are readily metabolized by plants.
- In the unlikely case the shallow groundwater may be used as a drinking water source, the site estimated average CT concentration exceeds the MCL of 0.0005 mg/l by a factor of about two. This exceedance is evaluated to be not of concern in terms of protection of human health. Therefore, it is concluded that chemical concentrations detected in the site shallow groundwater do not warrant further consideration related to protection of human health.

The **RECOMMENDATIONS** of this study are the following:

It is recommend that the information and conclusions in this report be considered in the future use of the Vineyard Buffer Zone Property. If the Vineyard Property is to remain in agricultural use, no further site environmental exploration is recommended.

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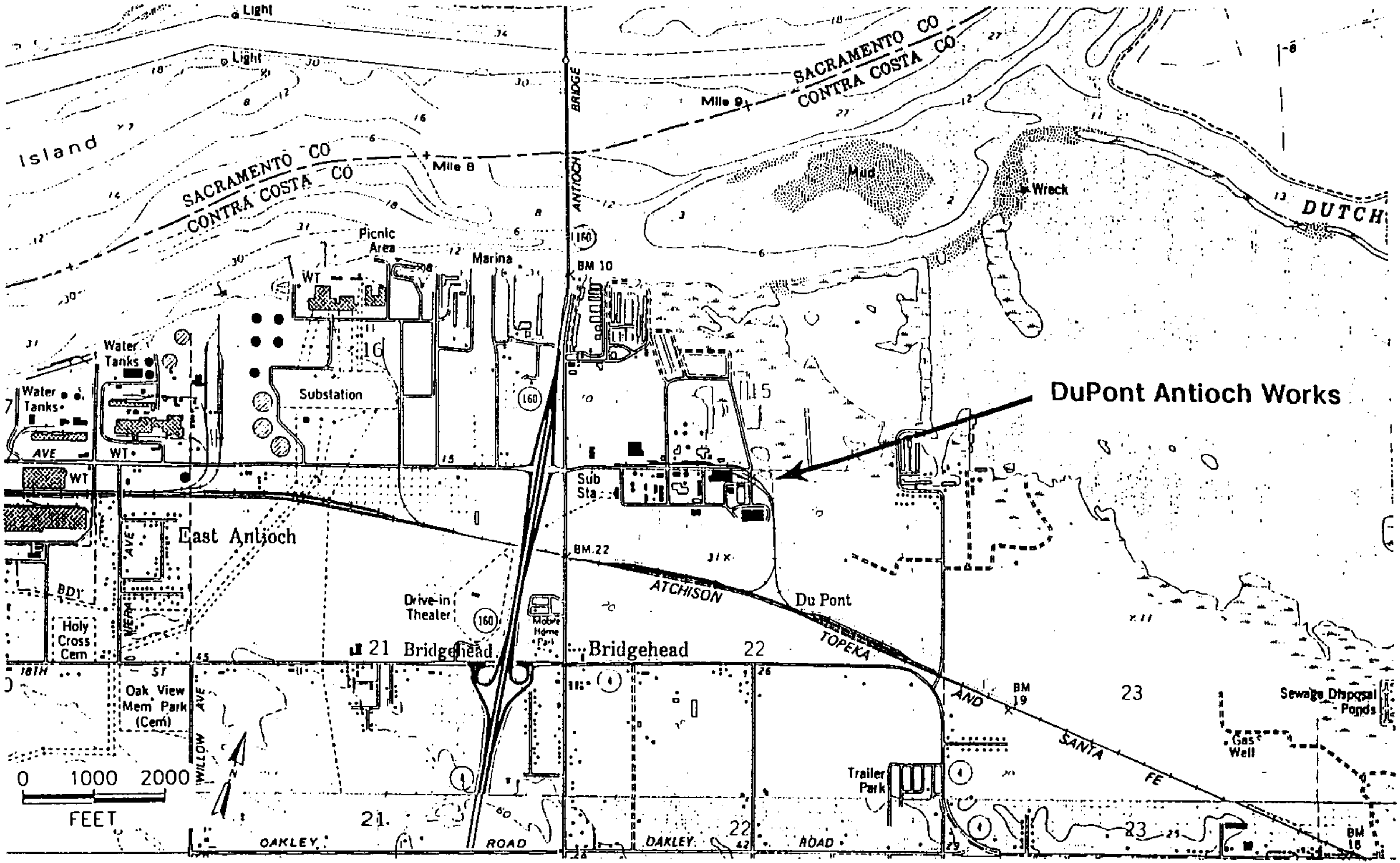


SOURCE: Topographic Maps, 7.5 Minute Series; Jersey Island (1978); Antioch North (1978); Antioch South (1980); Brentwood (1978).

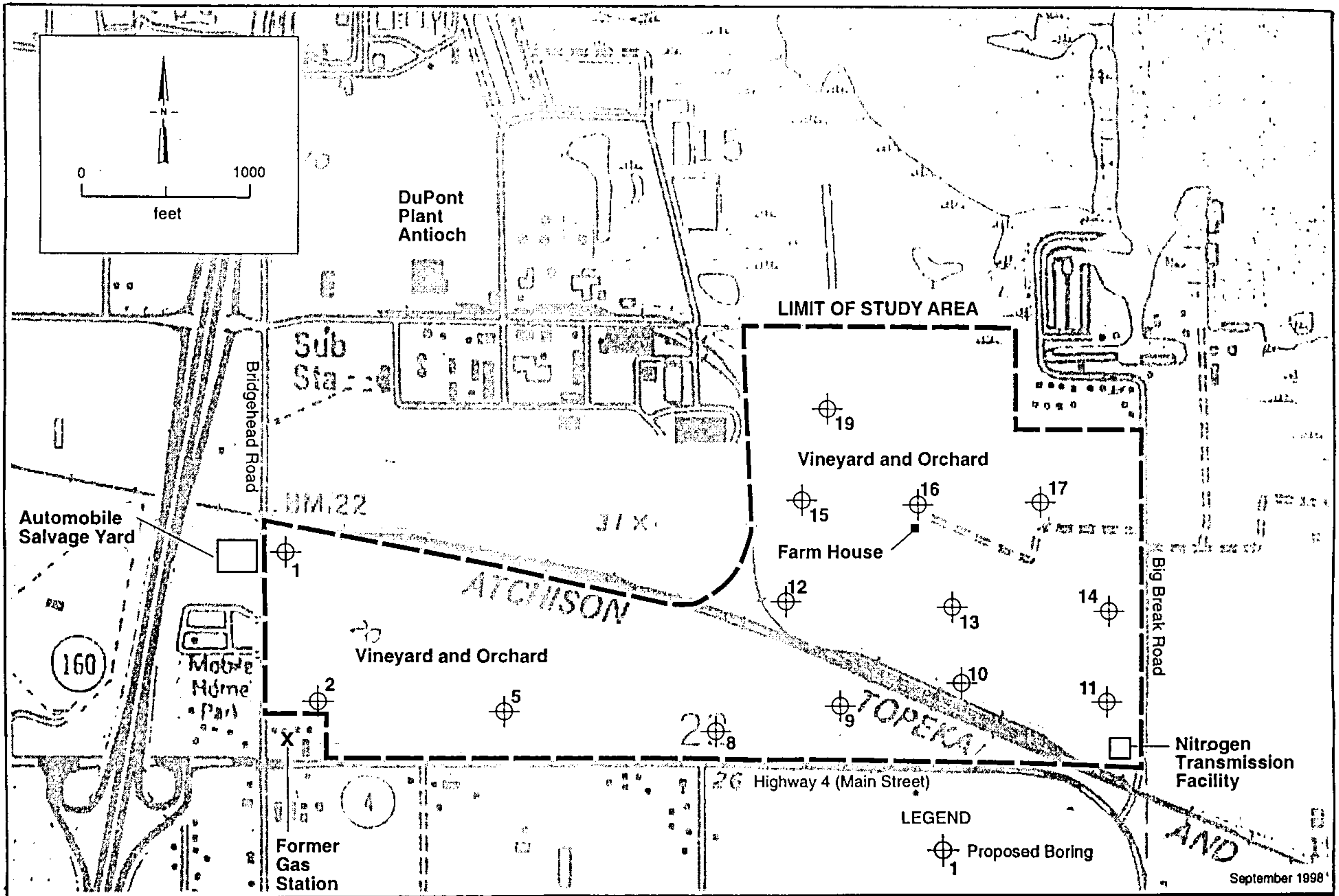
Project No.
40D6AN8078.99

DuPont Antioch Works Plant
Buffer Zone Area

URS Greiner Woodward Clyde

PHASE II
SITE LOCATION AND
REGIONAL GEOLOGY

April 1999
Figure 1



Project No. 40D6AN8078.99	DuPont Antioch Works Plant Buffer Zone Area	PHASE II EXPLORATION LOCATIONS	April 1999 Figure 2
URS Greiner Woodward Clyde			

Appendix A
Boring Logs

Appendix A
Boring Logs

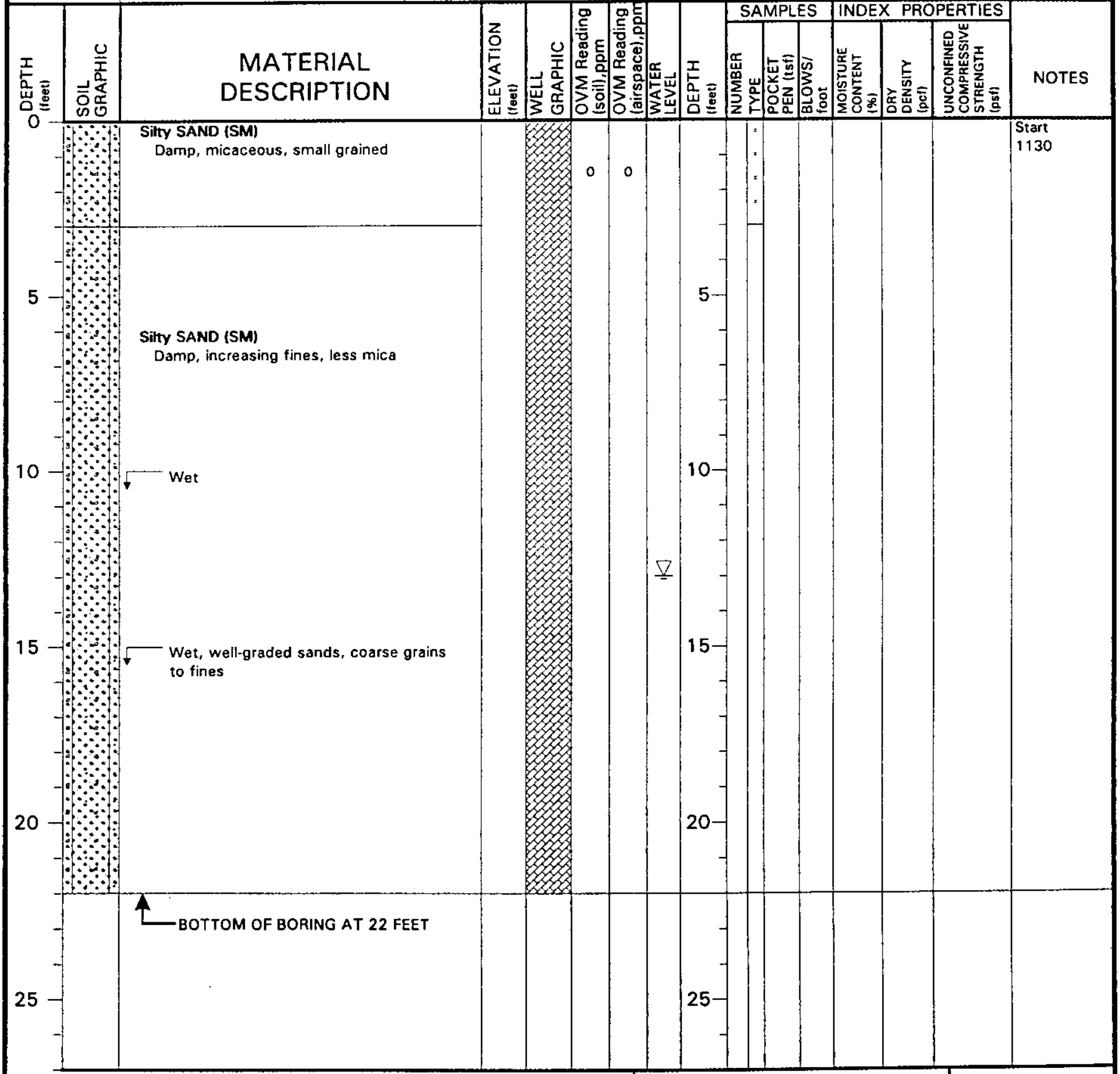
DU PONT ANTIOCH VINEYARD DIVESTITURE, Antioch, California

BORING LOCATION: Vineyard Divestiture			GROUND SURFACE ELEVATION (ft): TOP OF WELL CASING ELEVATION (ft): N/A
DRILLING AGENCY: Fast-Tek	DRILLER: N/A		DATE STARTED: 11/20/98 DATE FINISHED: 11/20/98
DRILLING EQUIPMENT: Geoprobe			COMPLETION DEPTHS: BORING: 22.0 (ft) WELL: N/A (ft)
DRILLING METHOD: Geoprobe	DRILL BIT: 2-1/4-in		SAMPLING METHOD: Jars and Bottles
SIZE AND TYPE OF CASING: Temporary 1"-dia. Screened PVC Used for Water Sampling			NUMBER OF SAMPLES: DIST.: 6 UNDIST.: 0
TYPE OF PERFORATION: N/A	FROM N/A	TO N/A	WATER DEPTH (ft): FIRST: 13 ∇ 24 hr.: ▼
SIZE AND TYPE OF PACK: N/A	FROM N/A	TO N/A	LOGGED BY: A.Giangerelli — CHECKED BY: A.Ridley

TYPE OF SEAL	TYPE	FR	TO	TYPE	FR	TO
	No. 1: Portland Cement/Bentonite Mix	0	22'	No. 3: N/A	N/A	N/A
	No. 2: N/A	N/A	N/A	No. 4: N/A	N/A	N/A

LOG OF ANT-S-DV-1

(Sheet 1 of 1)



Silty SAND (SM)
Damp, micaceous, small grained

OVM Reading (soil),ppm: 0 — OVM Reading (airspace),ppm: 0

Notes: Start 1130

Silty SAND (SM)
Damp, increasing fines, less mica

Wet (at 10 ft)

∇ (water level at 13 ft)

Wet, well-graded sands, coarse grains to fines (at 15 ft)

BOTTOM OF BORING AT 22 FEET

URS Greiner Woodward Clyde

PROJECT NO. 40-D6AN8078.00

LOG: 1

1/21/99 ENDUPONT DPANT

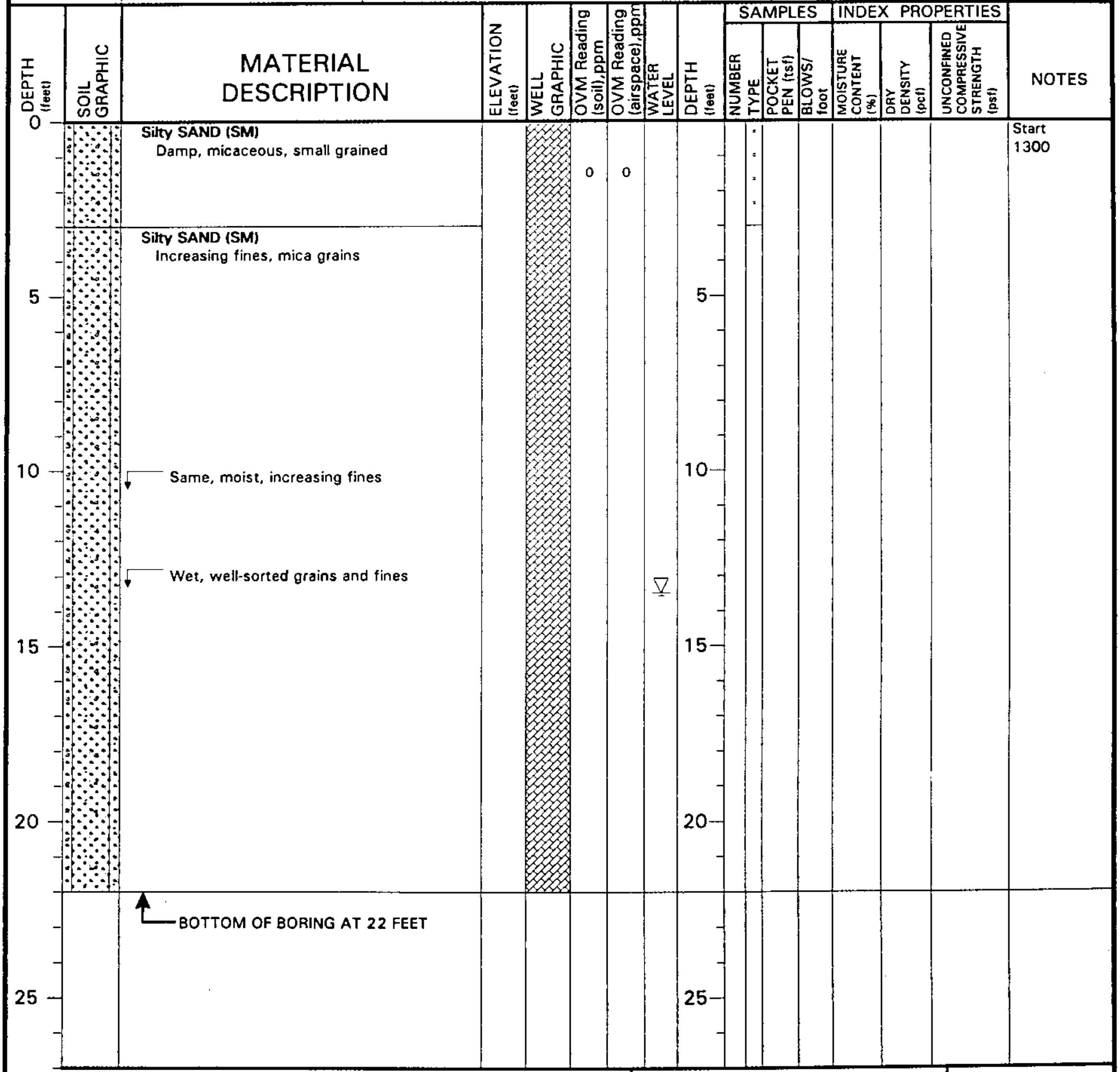
DU PONT ANTIOCH VINEYARD DIVESTITURE, Antioch, California

BORING LOCATION: Vineyard Divestiture			GROUND SURFACE ELEVATION (ft): TOP OF WELL CASING ELEVATION (ft): N/A
DRILLING AGENCY	Fast-Tek	DRILLER N/A	DATE STARTED: 11/20/98 DATE FINISHED: 11/20/98
DRILLING EQUIPMENT	Geoprobe		COMPLETION DEPTHS BORING: 22.0 (ft) WELL: N/A (ft)
DRILLING METHOD	Geoprobe	DRILL BIT 2-1/4-in	SAMPLING METHOD: Jars and Bottles
SIZE AND TYPE OF CASING	Temporary 1"-dia. Screened PVC Used for Water Sampling		NUMBER OF SAMPLES DIST.: 6 UNDIST.: 0
TYPE OF PERFORATION	N/A	FROM N/A TO N/A	WATER DEPTH (ft) FIRST: 13.5 ▽ 24 hr.: ▼
SIZE AND TYPE OF PACK	N/A	FROM N/A TO N/A	LOGGED BY A.Giangerelli CHECKED BY A.Ridley

TYPE OF SEAL	TYPE	FR	TO	TYPE	FR	TO
	No. 1: Portland Cement/Bentonite Mix	0	22'	No. 3: N/A	N/A	N/A
	No. 2: N/A	N/A	N/A	No. 4: N/A	N/A	N/A

LOG OF ANT-S-DV-2

(Sheet 1 of 1)



Silty SAND (SM)
Damp, micaceous, small grained

OVM Reading (soil): 0 OVM Reading (airspace): 0

Notes: Start 1300

Silty SAND (SM)
Increasing fines, mica grains

Same, moist, increasing fines

Wet, well-sorted grains and fines ▽

BOTTOM OF BORING AT 22 FEET

URS Greiner Woodward Clyde

PROJECT NO. 40-D6AN8078.00

LOG: 2

DU PONT ANTIOCH VINEYARD DIVESTITURE, Antioch, California

BORING LOCATION: Vineyard Divestiture

GROUND SURFACE ELEVATION (ft):
TOP OF WELL CASING ELEVATION (ft): N/A

DRILLING AGENCY: Fast-Tek

DRILLER: N/A

DATE STARTED: 11/20/98
DATE FINISHED: 11/20/98

DRILLING EQUIPMENT: Geoprobe

COMPLETION DEPTHS: BORING: 22.0 (ft) WELL: N/A (ft)

DRILLING METHOD: Geoprobe

DRILL BIT: 2-1/4-in

SAMPLING METHOD: Jars and Bottles

SIZE AND TYPE OF CASING: Temporary 1"-dia. Screened PVC Used for Water Sampling

NUMBER OF SAMPLES: DIST.: 6 UNDIST.: 0

TYPE OF PERFORATION: N/A FROM N/A TO N/A

WATER DEPTH (ft): FIRST: 6 ▽ 24 hr.: ▼

SIZE AND TYPE OF PACK: N/A FROM N/A TO N/A

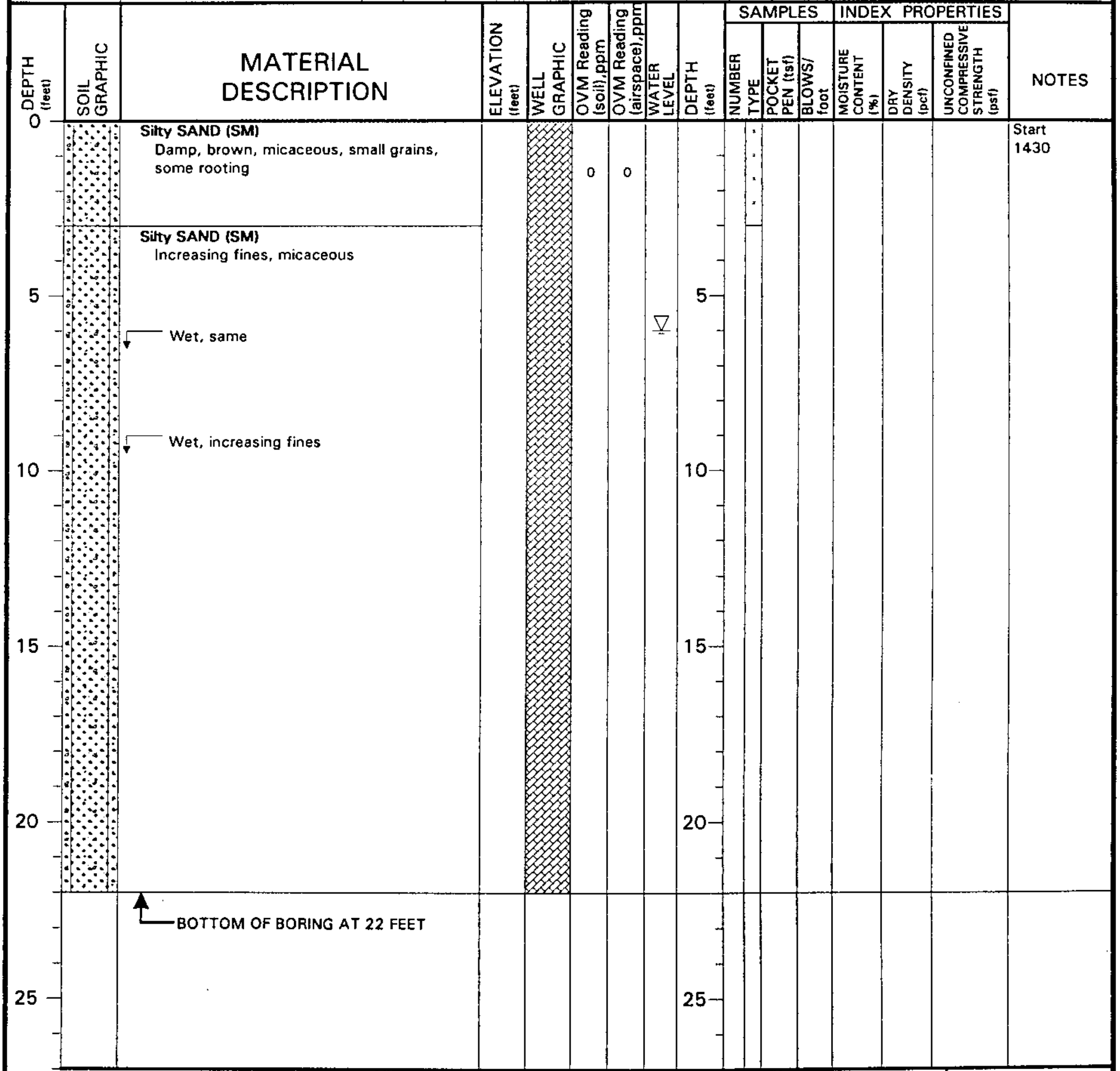
LOGGED BY: A.Giangerelli

CHECKED BY: A.Ridley

TYPE OF SEAL	TYPE	FR	TO	TYPE	FR	TO
	No. 1: Portland Cement/Bentonite Mix	0	22'	No. 3: N/A	N/A	N/A
	No. 2: N/A	N/A	N/A	No. 4: N/A	N/A	N/A

LOG OF ANT-S-DV-5

(Sheet 1 of 1)



Silty SAND (SM)
Damp, brown, micaceous, small grains, some rooting

OVM Reading (soil): 0 OVM Reading (airspace): 0

NOTES: Start 1430

Silty SAND (SM)
Increasing fines, micaceous

Wet, same ▽

Wet, increasing fines

BOTTOM OF BORING AT 22 FEET

URS Greiner Woodward Clyde

PROJECT NO. 40-D6AN8078.00

LOG: 5

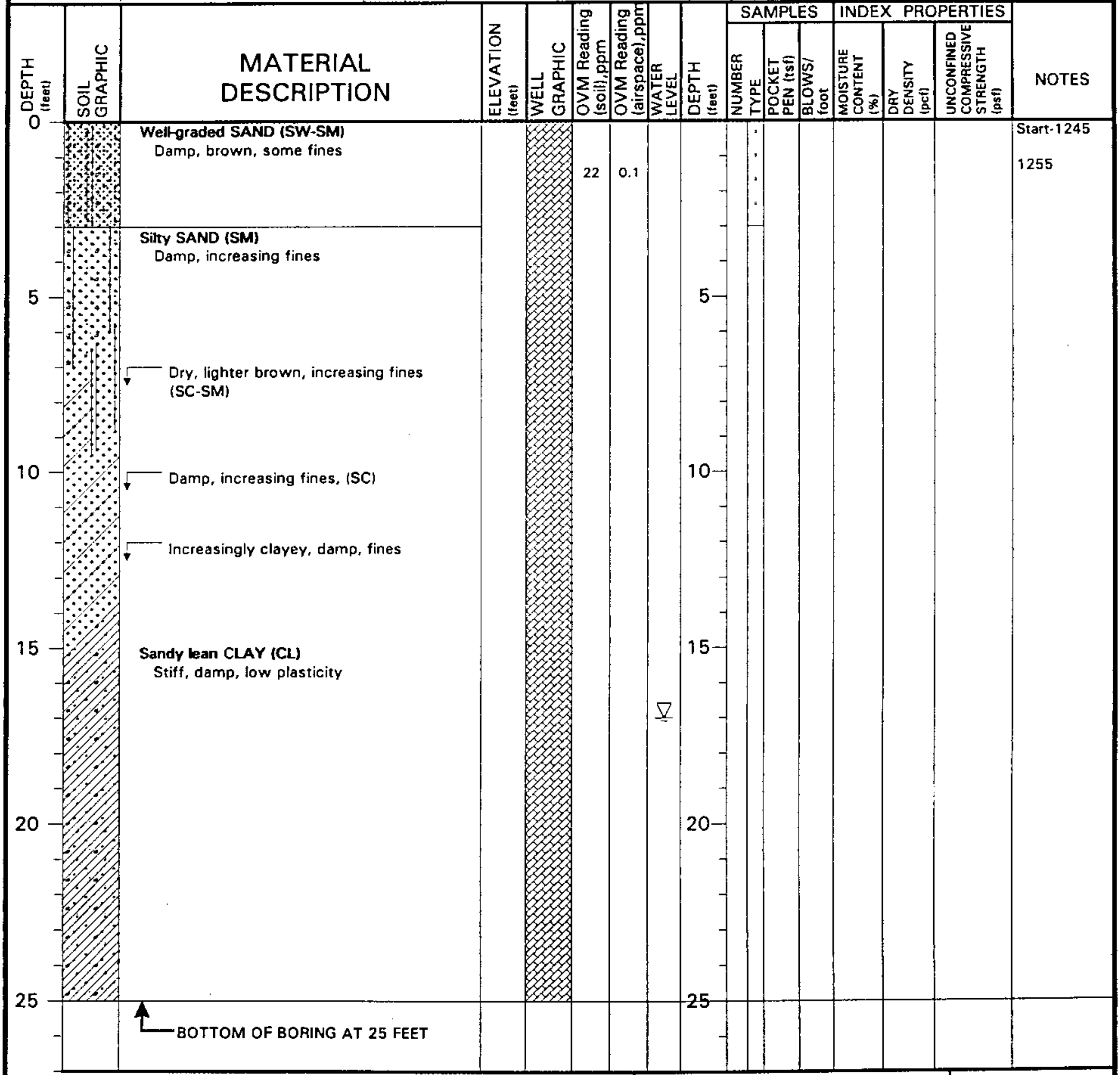
DU PONT ANTIOCH VINEYARD DIVESTITURE, Antioch, California

BORING LOCATION: Vineyard Divestiture		GROUND SURFACE ELEVATION (ft): TOP OF WELL CASING ELEVATION (ft): N/A	
DRILLING AGENCY Fast-Tek	DRILLER N/A	DATE STARTED: 11/17/98 DATE FINISHED: 11/17/98	
DRILLING EQUIPMENT Geoprobe		COMPLETION DEPTHS	BORING: 25.0 (ft) WELL: N/A (ft)
DRILLING METHOD Geoprobe	DRILL BIT 2-1/4-in	SAMPLING METHOD: Jars and Bottles	
SIZE AND TYPE OF CASING Temporary 1"-dia. Screened PVC Used for Water Sampling		NUMBER OF SAMPLES	DIST.: 6 UNDIST.: 0
TYPE OF PERFORATION N/A	FROM N/A TO N/A	WATER DEPTH (ft)	FIRST: 17 ▽ 24 hr.: ▼
SIZE AND TYPE OF PACK N/A	FROM N/A TO N/A	LOGGED BY A.Giangerelli	CHECKED BY A.Ridley

TYPE OF SEAL	TYPE	FR	TO	TYPE	FR	TO
	No. 1: Portland Cement/Bentonite Mix	0	25'	No. 3: N/A	N/A	N/A
	No. 2: N/A	N/A	N/A	No. 4: N/A	N/A	N/A

LOG OF ANT-S-DV-8

(Sheet 1 of 1)



Well-graded SAND (SW-SM)
Damp, brown, some fines

Silty SAND (SM)
Damp, increasing fines

Dry, lighter brown, increasing fines (SC-SM)

Damp, increasing fines, (SC)

Increasingly clayey, damp, fines

Sandy lean CLAY (CL)
Stiff, damp, low plasticity

BOTTOM OF BORING AT 25 FEET

URS Greiner Woodward Clyde | PROJECT NO. 40-D6AN8078.00 | LOG: 8

DU PONT ANTIOCH VINEYARD DIVESTITURE, Antioch, California

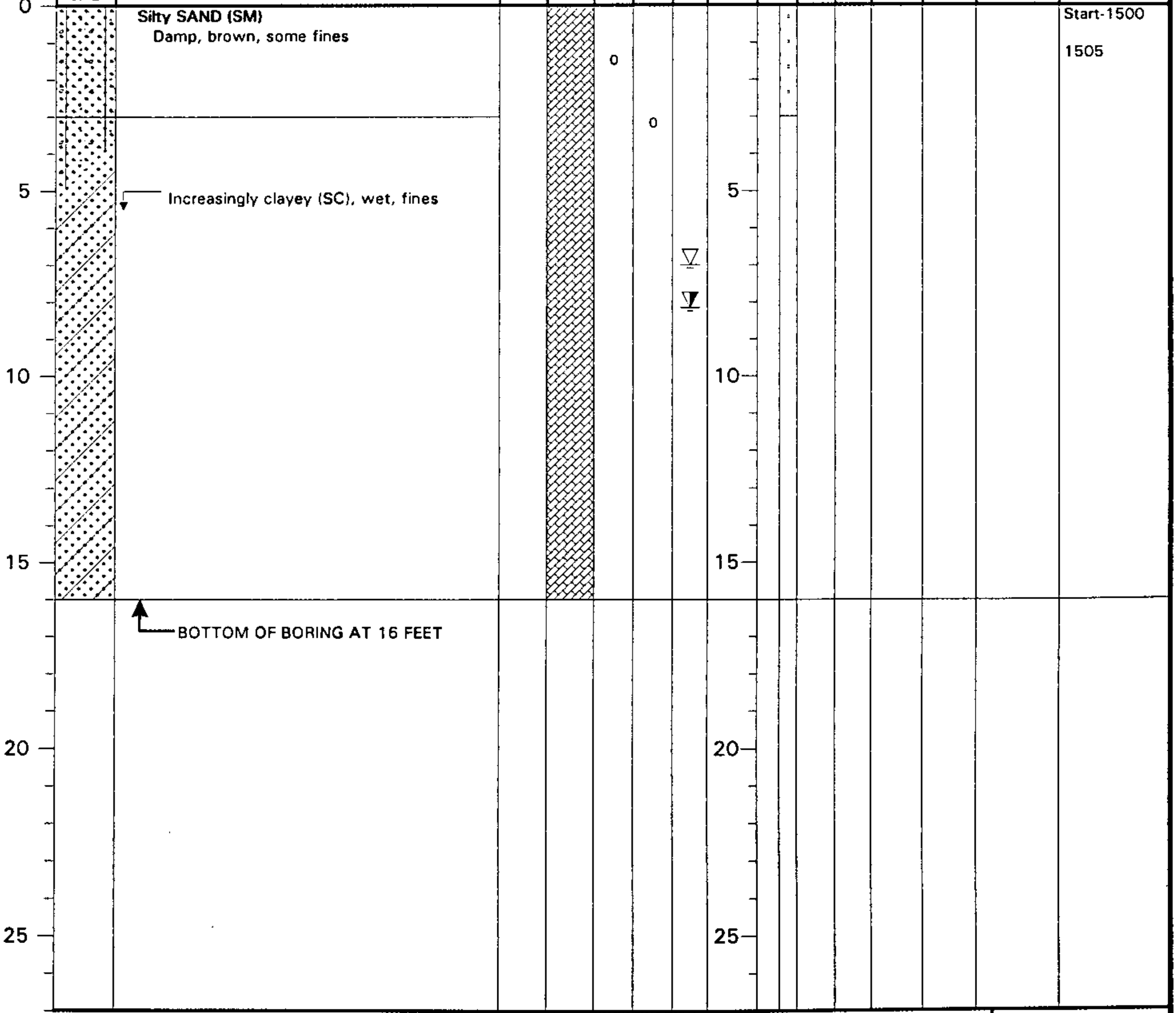
BORING LOCATION: Vineyard Divestiture				GROUND SURFACE ELEVATION (ft): TOP OF WELL CASING ELEVATION (ft): N/A
DRILLING AGENCY	Fast-Tek	DRILLER	N/A	DATE STARTED: 11/17/98 DATE FINISHED: 11/17/98
DRILLING EQUIPMENT	Geoprobe			COMPLETION DEPTHS BORING: 16.0 (ft) WELL: N/A (ft)
DRILLING METHOD	Geoprobe	DRILL BIT	2-1/4-in	SAMPLING METHOD: Jars and Bottles
SIZE AND TYPE OF CASING	Temporary 1"-dia. Screened PVC Used for Water Sampling			NUMBER OF SAMPLES DIST.: 6 UNDIST.: 0
TYPE OF PERFORATION	N/A	FROM N/A TO N/A		WATER DEPTH (ft) FIRST: 7 ∇ 24 hr.: 8.15 ▼
SIZE AND TYPE OF PACK	N/A	FROM N/A TO N/A		LOGGED BY A.Giangerelli CHECKED BY A.Ridley

TYPE OF SEAL	TYPE	FR	TO	TYPE	FR	TO
	No. 1: Portland Cement/Bentonite Mix	0	16'	No. 3: N/A	N/A	N/A
	No. 2: N/A	N/A	N/A	No. 4: N/A	N/A	N/A

LOG OF ANT-S-DV-9

(Sheet 1 of 1)

DEPTH (feet)	SOIL GRAPHIC	MATERIAL DESCRIPTION	ELEVATION (feet)	WELL GRAPHIC	OVM Reading (soil),ppm	OVM Reading (airspace),ppm	WATER LEVEL	DEPTH (feet)	SAMPLES NUMBER	SAMPLES TYPE	POCKET PEN (tsf)	BLOWS/ foot	INDEX PROPERTIES MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	NOTES



Silty SAND (SM)
Damp, brown, some fines

OVM (soil): 0
OVM (airspace): 0

Increasingly clayey (SC), wet, fines

BOTTOM OF BORING AT 16 FEET

Start-1500
1505

URS Greiner Woodward Clyde	PROJECT NO. 40-D6AN8078.00	LOG: 9

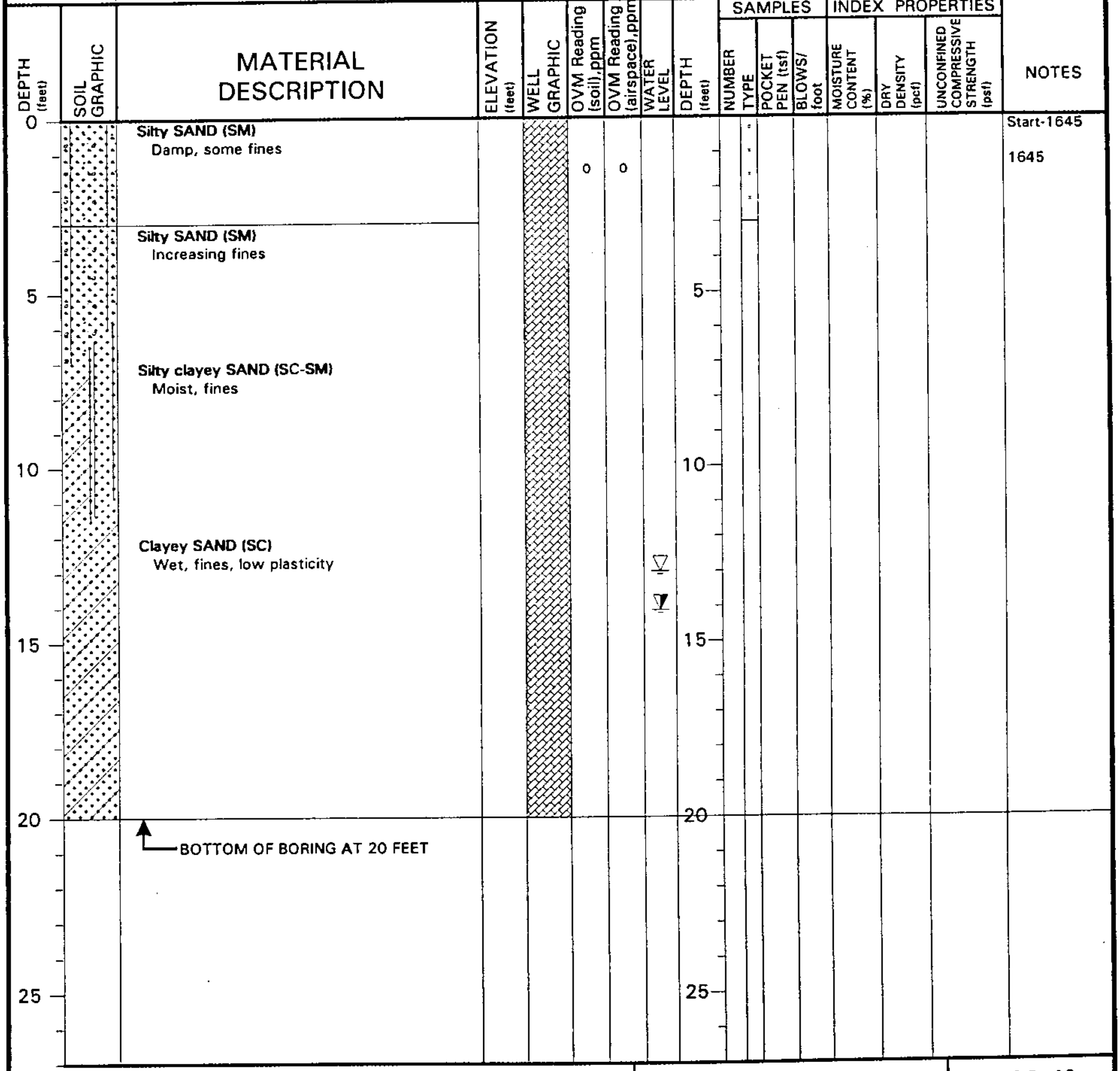
DU PONT ANTIOCH VINEYARD DIVESTITURE, Antioch, California

BORING LOCATION: Vineyard Divestiture			GROUND SURFACE ELEVATION (ft): TOP OF WELL CASING ELEVATION (ft): N/A
DRILLING AGENCY	Fast-Tek	DRILLER N/A	DATE STARTED: 11/18/98 DATE FINISHED: 11/18/98
DRILLING EQUIPMENT	Geoprobe		COMPLETION DEPTHS BORING: 20.0 (ft) WELL: N/A (ft)
DRILLING METHOD	Geoprobe	DRILL BIT 2-1/4-in	SAMPLING METHOD: Jars and Bottles
SIZE AND TYPE OF CASING	Temporary 1"-dia. Screened PVC Used for Water Sampling		NUMBER OF SAMPLES DIST.: 6 UNDIST.: 0
TYPE OF PERFORATION	N/A	FROM N/A TO N/A	WATER DEPTH (ft) FIRST: 13 ∇ 24 hr.: 14.11 ▼
SIZE AND TYPE OF PACK	N/A	FROM N/A TO N/A	LOGGED BY A.Giangerelli CHECKED BY A.Ridley

TYPE OF SEAL	TYPE	FR	TO	TYPE	FR	TO
	No. 1: Portland Cement/Bentonite Mix	0	20'	No. 3: N/A	N/A	N/A
	No. 2: N/A	N/A	N/A	No. 4: N/A	N/A	N/A

LOG OF ANT-S-DV-10

(Sheet 1 of 1)



MATERIAL DESCRIPTION

Silty SAND (SM)
Damp, some fines

OVM Reading (soil): 0 OVM Reading (airspace): 0

Silty SAND (SM)
Increasing fines

Silty clayey SAND (SC-SM)
Moist, fines

Clayey SAND (SC)
Wet, fines, low plasticity

BOTTOM OF BORING AT 20 FEET

NOTES

Start-1645

1645

URS Greiner Woodward Clyde

PROJECT NO. 40-D6AN8078.00

LOG: 10

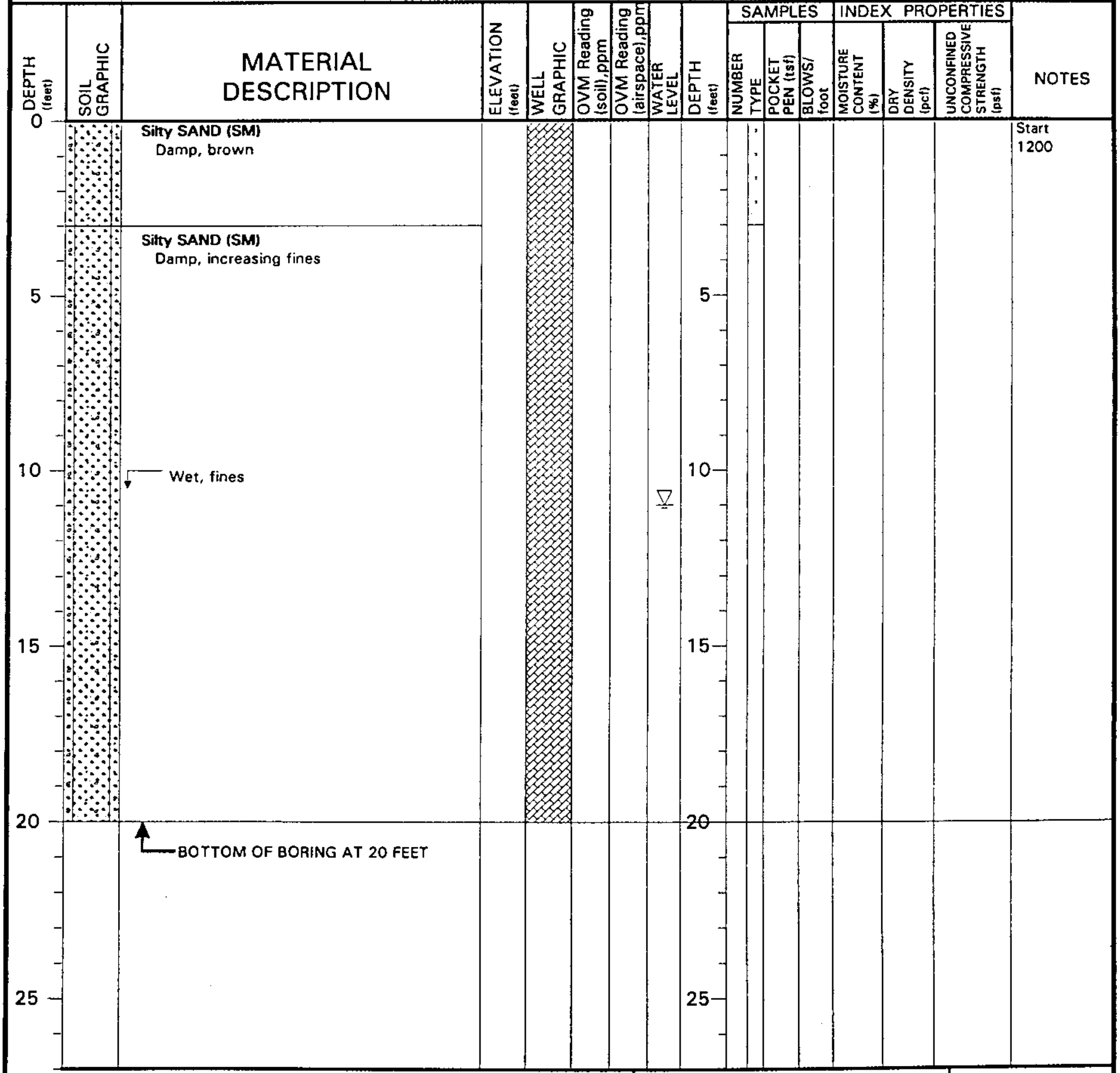
DU PONT ANTIOCH VINEYARD DIVESTITURE, Antioch, California

BORING LOCATION: Vineyard Divestiture			GROUND SURFACE ELEVATION (ft): TOP OF WELL CASING ELEVATION (ft): N/A
DRILLING AGENCY	Fast-Tek	DRILLER N/A	DATE STARTED: 11/19/98 DATE FINISHED: 11/19/98
DRILLING EQUIPMENT	Geoprobe		COMPLETION DEPTHS BORING: 20.0 (ft) WELL: N/A (ft)
DRILLING METHOD	Geoprobe	DRILL BIT 2-1/4-in	SAMPLING METHOO: Jars and Bottles
SIZE AND TYPE OF CASING	Temporary 1"-dia. Screened PVC Used for Water Sampling		NUMBER OF SAMPLES DIST.: 6 UNDIST.: 0
TYPE OF PERFORATION	N/A	FROM N/A TO N/A	WATER DEPTH (ft) FIRST: 11 ▽ 24 hr.: ▼
SIZE AND TYPE OF PACK	N/A	FROM N/A TO N/A	LOGGED BY A.Giangerelli CHECKED BY A.Ridley

TYPE OF SEAL	TYPE	FR	TO	TYPE	FR	TO
	No. 1: Portland Cement/Bentonite Mix	0	20'	No. 3: N/A	N/A	N/A
	No. 2: N/A	N/A	N/A	No. 4: N/A	N/A	N/A

LOG OF ANT-S-DV-11

(Sheet 1 of 1)



Depth (feet)	Material Description	Notes
0	**Silty SAND (SM)** Damp, brown	Start 1200
	Silty SAND (SM) Damp, increasing fines	
10	Wet, fines	
20	BOTTOM OF BORING AT 20 FEET	

URS Greiner Woodward Clyde | PROJECT NO. 40-D6AN8078.00 | LOG: 11

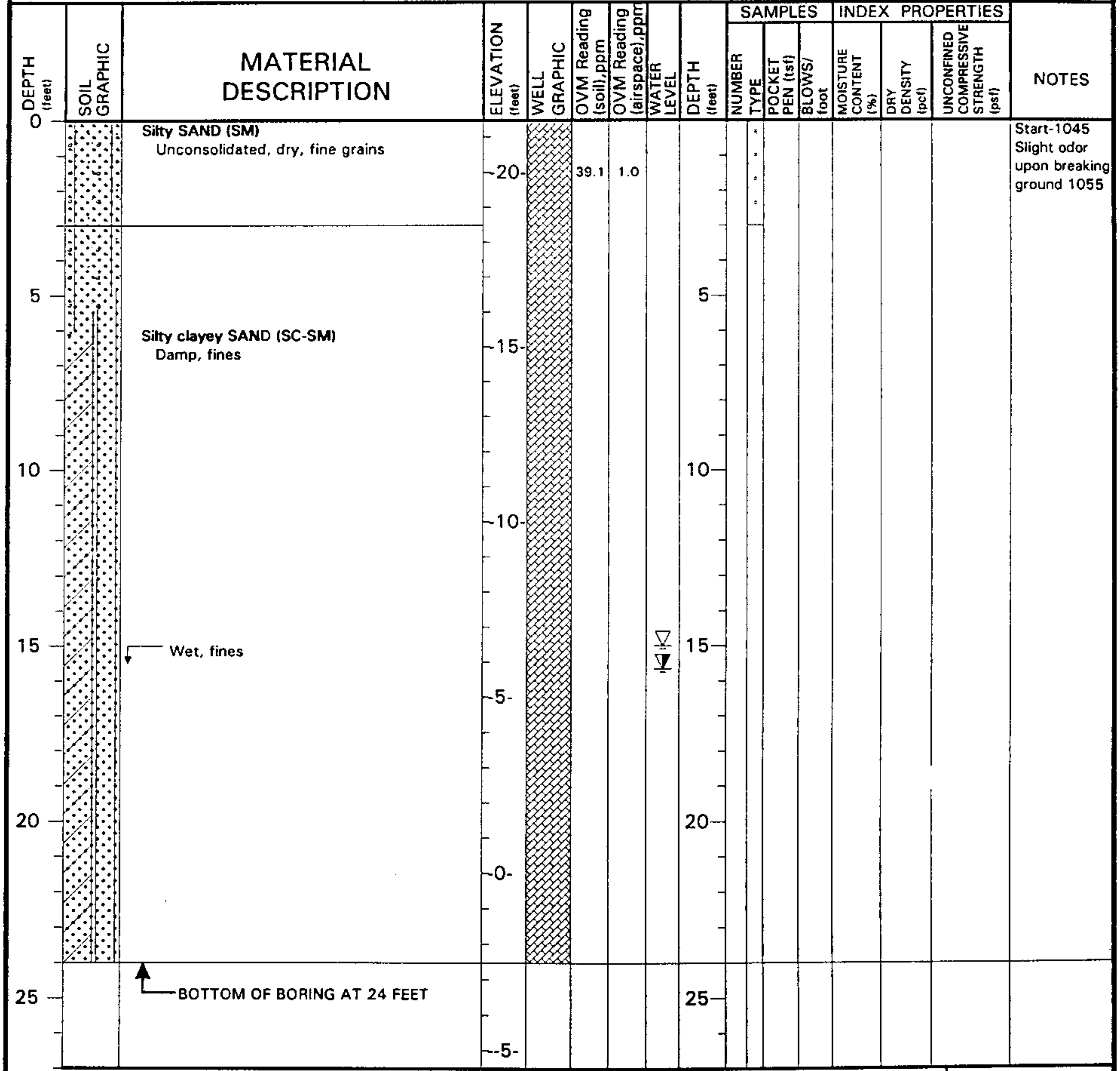
DU PONT ANTIOCH VINEYARD DIVESTITURE, Antioch, California

BORING LOCATION: Vineyard Divestiture			GROUND SURFACE ELEVATION (ft): 21.47 TOP OF WELL CASING ELEVATION (ft): 22.13
DRILLING AGENCY	Fast-Tek	DRILLER N/A	DATE STARTED: 11/18/98 DATE FINISHED: 11/18/98
DRILLING EQUIPMENT	Geoprobe		COMPLETION DEPTHS BORING: 24.0 (ft) 'WELL: N/A (ft)
DRILLING METHOD	Geoprobe	DRILL BIT 2-1/4-in	SAMPLING METHOD: Jars and Bottles
SIZE AND TYPE OF CASING	Temporary 1"-dia. Screened PVC Used for Water Sampling		NUMBER OF SAMPLES DIST.: 6 UNDIST.: 0
TYPE OF PERFORATION	N/A	FROM N/A TO N/A	WATER DEPTH (ft) FIRST: 15 ∇ 24 hr.: 15.66 ▼
SIZE AND TYPE OF PACK	N/A	FROM N/A TO N/A	LOGGED BY A.Giangerelli / CHECKED BY A.Ridley

TYPE OF SEAL	TYPE	FR	TO	TYPE	FR	TO
	No. 1: Portland Cement/Bentonite Mix	0	24'	No. 3: N/A	N/A	N/A
	No. 2: N/A	N/A	N/A	No. 4: N/A	N/A	N/A

LOG OF ANT-S-DV-12

(Sheet 1 of 1)



Silty SAND (SM)
Unconsolidated, dry, fine grains

OVM Reading (soil): 39.1 — OVM Reading (airspace): 1.0

Start-1045
Slight odor upon breaking ground 1055

Silty clayey SAND (SC-SM)
Damp, fines

Wet, fines

BOTTOM OF BORING AT 24 FEET

URS Greiner Woodward Clyde | PROJECT NO. 40-D6AN8078.00 | LOG: 12

1/21/99 ENDUPONT DPANT

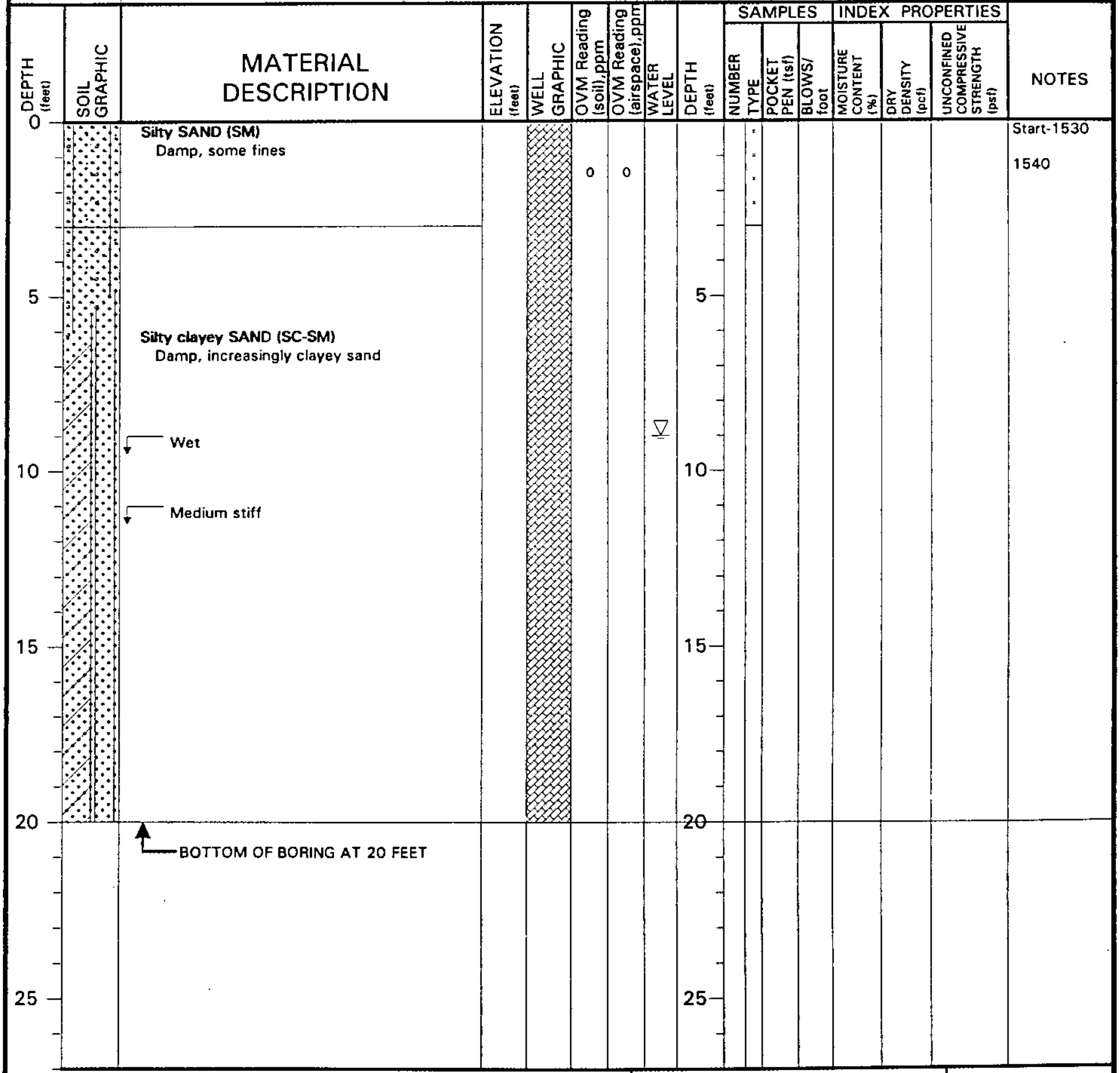
DU PONT ANTIOCH VINEYARD DIVESTITURE, Antioch, California

BORING LOCATION: Vineyard Divestiture		GROUND SURFACE ELEVATION (ft): TOP OF WELL CASING ELEVATION (ft): N/A	
DRILLING AGENCY Fast-Tek	DRILLER N/A	DATE STARTED: 11/18/98 DATE FINISHED: 11/18/98	
DRILLING EQUIPMENT Geoprobe		COMPLETION DEPTHS	BORING: 20.0 (ft) WELL: N/A (ft)
DRILLING METHOD Geoprobe	DRILL BIT 2-1/4-in	SAMPLING METHOD: Jars and Bottles	
SIZE AND TYPE OF CASING Temporary 1"-dia. Screened PVC Used for Water Sampling		NUMBER OF SAMPLES DIST.: 6	UNDIST.: 0
TYPE OF PERFORATION N/A	FROM N/A TO N/A	WATER DEPTH (ft) FIRST: 9 ∇	24 hr.: ▼
SIZE AND TYPE OF PACK N/A	FROM N/A TO N/A	LOGGED BY A.Giangerelli	CHECKED BY A.Ridley

TYPE OF SEAL	TYPE	FR	TO	TYPE	FR	TO
	No. 1: Portland Cement/Bentonite Mix	0	20'	No. 3: N/A	N/A	N/A
	No. 2: N/A	N/A	N/A	No. 4: N/A	N/A	N/A

LOG OF ANT-S-DV-13

(Sheet 1 of 1)



Silty SAND (SM)
Damp, some fines

OVM Reading (soil): 0; OVM Reading (airspace): 0

Start-1530

1540

Silty clayey SAND (SC-SM)
Damp, increasingly clayey sand

Wet

Medium stiff

BOTTOM OF BORING AT 20 FEET

URS Greiner Woodward Clyde	PROJECT NO. 40-D6AN8078.00	LOG: 13

1/21/99 ENDUPONT DPANT

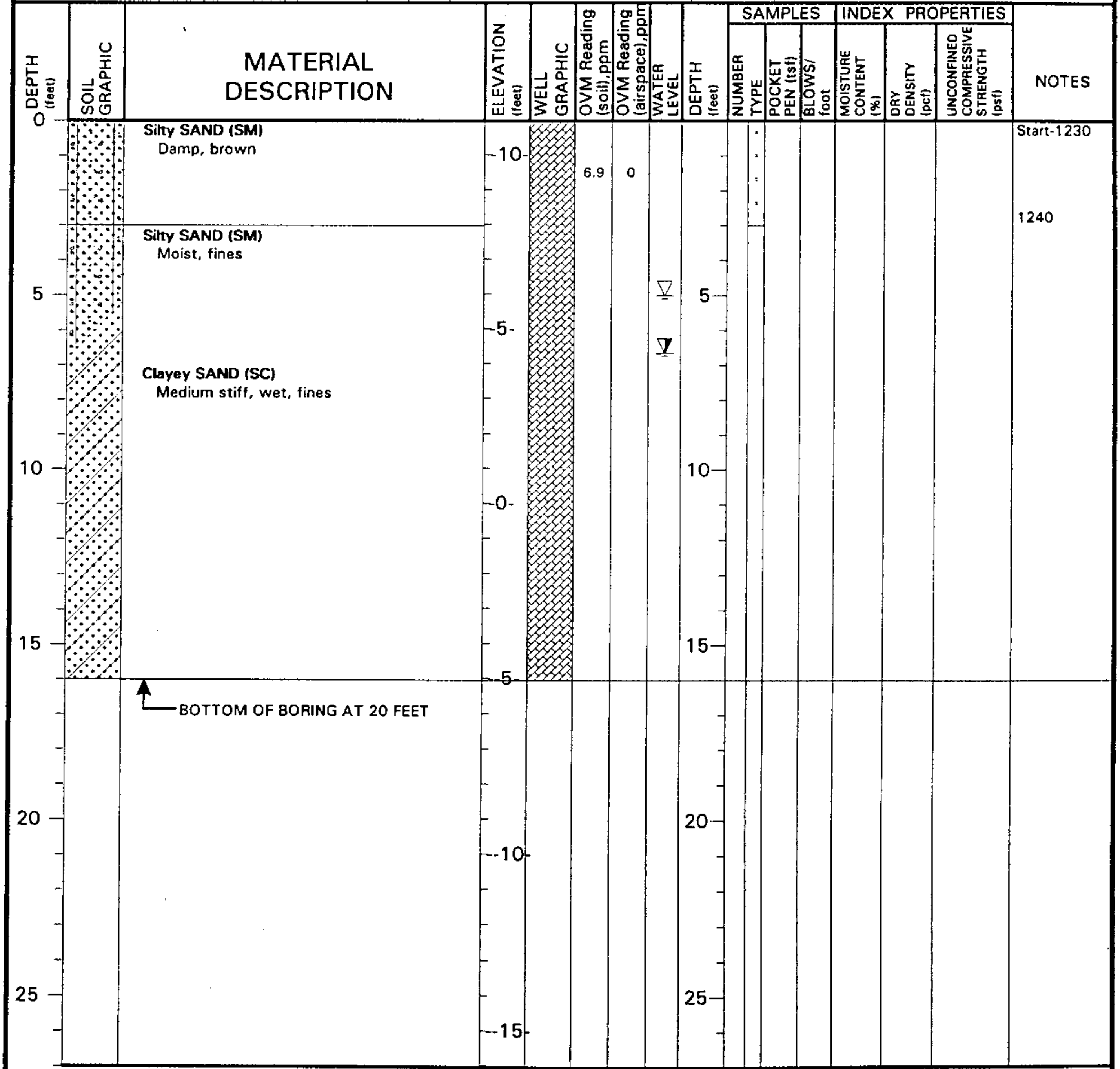
DU PONT ANTIOCH VINEYARD DIVESTITURE, Antioch, California

BORING LOCATION: Vineyard Divestiture			GROUND SURFACE ELEVATION (ft): 10.95 TOP OF WELL CASING ELEVATION (ft): 11.36
DRILLING AGENCY	Fast-Tek	DRILLER N/A	DATE STARTED: 11/18/98 DATE FINISHED: 11/18/98
DRILLING EQUIPMENT	Geoprobe		COMPLETION DEPTHS BORING: 16.0 (ft) WELL: N/A (ft)
DRILLING METHOD	Geoprobe	DRILL BIT 2-1/4-in	SAMPLING METHOD: Jars and Bottles
SIZE AND TYPE OF CASING	Temporary 1"-dia. Screened PVC Used for Water Sampling		NUMBER OF SAMPLES DIST.: 6 UNDIST.: 0
TYPE OF PERFORATION	N/A	FROM N/A TO N/A	WATER DEPTH (ft) FIRST: 5 ∇ 24 hr.: 6.65 ▼
SIZE AND TYPE OF PACK	N/A	FROM N/A TO N/A	LOGGED BY A.Giangerelli · CHECKED BY A.Ridley

TYPE OF SEAL	TYPE	FR	TO	TYPE	FR	TO
	No. 1: Portland Cement/Bentonite Mix	0	16'	No. 3: N/A	N/A	N/A
	No. 2: N/A	N/A	N/A	No. 4: N/A	N/A	N/A

LOG OF ANT-S-DV-14

(Sheet 1 of 1)



Silty SAND (SM)
Damp, brown

6.9 0

Start-1230

1240

Silty SAND (SM)
Moist, fines

Clayey SAND (SC)
Medium stiff, wet, fines

BOTTOM OF BORING AT 20 FEET

URS Greiner Woodward Clyde PROJECT NO. 40-D6AN8078.00 LOG: 14

DU PONT ANTIOCH VINEYARD DIVESTITURE, Antioch, California

BORING LOCATION: Vineyard Divestiture			GROUND SURFACE ELEVATION (ft): TOP OF WELL CASING ELEVATION (ft): N/A
DRILLING AGENCY	Fast-Tek	DRILLER N/A	DATE STARTED: 11/20/98 DATE FINISHED: 11/20/98
DRILLING EQUIPMENT	Geoprobe		COMPLETION DEPTHS BORING: 20.0 (ft) WELL: N/A (ft)
DRILLING METHOD	Geoprobe	DRILL BIT 2-1/4-in	SAMPLING METHOD: Jars and Bottles
SIZE AND TYPE OF CASING	Temporary 1"-dia. Screened PVC Used for Water Sampling		NUMBER OF SAMPLES DIST.: 6 UNDIST.: 0
TYPE OF PERFORATION	N/A	FROM N/A TO N/A	WATER DEPTH (ft) FIRST: 6.5 ∇ 24 hr.: ▼
SIZE AND TYPE OF PACK	N/A	FROM N/A TO N/A	LOGGED BY A.Giangerelli CHECKED BY A.Ridley

TYPE OF SEAL	TYPE	FR	TO	TYPE	FR	TO
	No. 1: Portland Cement/Bentonite Mix	0	20'	No. 3: N/A	N/A	N/A
	No. 2: N/A	N/A	N/A	No. 4: N/A	N/A	N/A

LOG OF ANT-S-DV-15

(Sheet 1 of 1)

DEPTH (feet)	SOIL GRAPHIC	MATERIAL DESCRIPTION	ELEVATION (feet)	WELL GRAPHIC	OVM Reading (soil),ppm	OVM Reading (airspace),ppm	WATER LEVEL	DEPTH (feet)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES POCKET PEN (tsf)	SAMPLES BLOWS/ foot	INDEX PROPERTIES MOISTURE CONTENT (%)	INDEX PROPERTIES DRY DENSITY (pcf)	INDEX PROPERTIES UNCONFINED COMPRESSIVE STRENGTH (psf)	NOTES
0		**Silty SAND (SM)** Damp, small grains, some rooting			1.9	0										Start 0835
		Silty SAND (SM) Fines, rooting														
5								5								
		Wet, fine sand, increasing fines					∇									
10								10								
15								15								
20		BOTTOM OF BORING AT 20 FEET						20								
25								25								

DU PONT ANTIOCH VINEYARD DIVESTITURE, Antioch, California

BORING LOCATION: Vineyard Divestiture			GROUND SURFACE ELEVATION (ft): 12.17 TOP OF WELL CASING ELEVATION (ft): 12.57
DRILLING AGENCY	Fast-Tek	DRILLER N/A	DATE STARTED: 11/18/98 DATE FINISHED: 11/18/98
DRILLING EQUIPMENT	Geoprobe		COMPLETION DEPTHS BORING: 18.0 (ft) ' WELL: N/A (ft)
DRILLING METHOD	Geoprobe	DRILL BIT 2-1/4-in	SAMPLING METHOD: Jars and Bottles
SIZE AND TYPE OF CASING	Temporary 1"-dia. Screened PVC Used for Water Sampling		NUMBER OF SAMPLES DIST.: 6 UNDIST.: 0
TYPE OF PERFORATION	N/A	FROM N/A TO N/A	WATER DEPTH (ft) FIRST: 10 ▽ 24 hr.: 8.18 ▼
SIZE AND TYPE OF PACK	N/A	FROM N/A TO N/A	LOGGED BY A.Giangerelli CHECKED BY A.Ridley

TYPE OF SEAL	TYPE	FR	TO	TYPE	FR	TO
	No. 1: Portland Cement/Bentonite Mix	0	18'	No. 3: N/A	N/A	N/A
	No. 2: N/A	N/A	N/A	No. 4: N/A	N/A	N/A

LOG OF ANT-S-DV-16

(Sheet 1 of 1)

DEPTH (feet)	SOIL GRAPHIC	MATERIAL DESCRIPTION	ELEVATION (feet)	WELL GRAPHIC	OVM Reading (soil),ppm	OVM Reading (airspace),ppm	WATER LEVEL	DEPTH (feet)	SAMPLES NUMBER	SAMPLES TYPE	POCKET PEN (tsf)	BLOWS/ foot	INDEX PROPERTIES MOISTURE CONTENT (%)	DRY DENSITY (pcf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	NOTES
0		**Silty SAND (SM)** Dry, very fine			44.7	17.3										Start-0900 Strong hydrocarbon / acetone odor 0910
			10													
		Silty SAND (SM) Dry, fines														
5								5								
		Damp, increasing fines	5			3.8	▼									
		Clayey SAND (SC) Wet, increasing clay, fines														
10							▽	10								
		Wet, brown														
			0													
15		Medium stiff, wet, low plasticity						15								
			-5													
		BOTTOM OF BORING AT 18 FEET														
20								20								
			-10													
25								25								

URS Greiner Woodward Clyde	PROJECT NO. 40-D6AN8078.00	LOG: 16

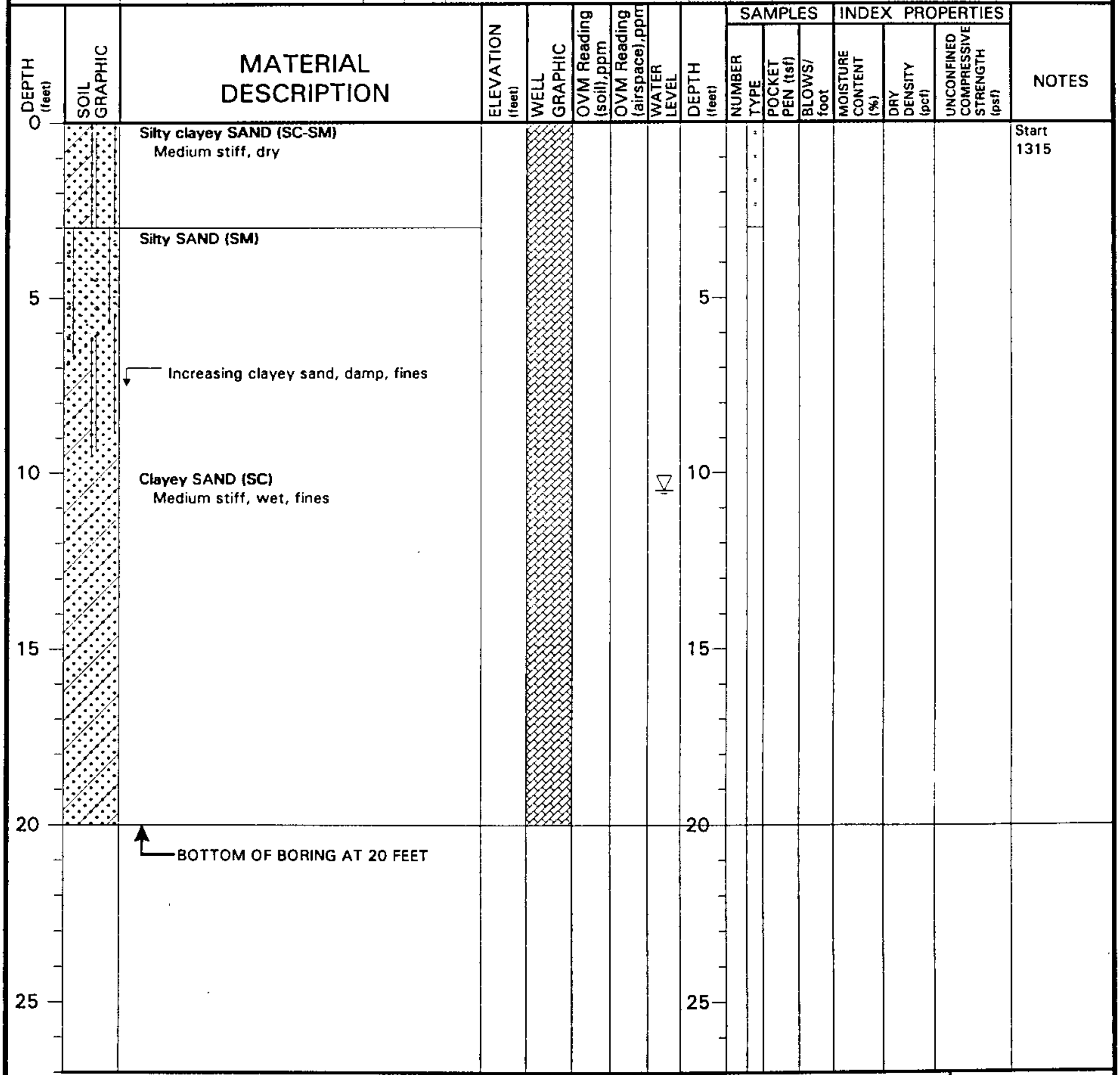
DU PONT ANTIOCH VINEYARD DIVESTITURE, Antioch, California

BORING LOCATION: Vineyard Divestiture			GROUND SURFACE ELEVATION (ft): TOP OF WELL CASING ELEVATION (ft): N/A
DRILLING AGENCY Fast-Tek	DRILLER N/A		DATE STARTED: 11/19/98 DATE FINISHED: 11/19/98
DRILLING EQUIPMENT Geoprobe			COMPLETION DEPTHS BORING: 20.0 (ft) WELL: N/A (ft)
DRILLING METHOD Geoprobe	DRILL BIT 2-1/4-in		SAMPLING METHOD: Jars and Bottles
SIZE AND TYPE OF CASING Temporary 1"-dia. Screened PVC Used for Water Sampling			NUMBER OF SAMPLES DIST.: 6 UNDIST.: 0
TYPE OF PERFORATION N/A	FROM N/A	TO N/A	WATER DEPTH (ft) FIRST: 10.5 ∇ 24 hr.: ▼
SIZE AND TYPE OF PACK N/A	FROM N/A	TO N/A	LOGGED BY A.Giangerelli CHECKED BY A.Ridley

TYPE OF SEAL	TYPE	FR	TO	TYPE	FR	TO
	No. 1: Portland Cement/Bentonite Mix	0	20'	No. 3: N/A	N/A	N/A
	No. 2: N/A	N/A	N/A	No. 4: N/A	N/A	N/A

LOG OF ANT-S-DV-17

(Sheet 1 of 1)



Silty clayey SAND (SC-SM)
Medium stiff, dry

Silty SAND (SM)

Increasing clayey sand, damp, fines

Clayey SAND (SC)
Medium stiff, wet, fines

BOTTOM OF BORING AT 20 FEET

NOTES: Start 1315

URS Greiner Woodward Clyde

PROJECT NO. 40-D6AN8078.00

LOG: 17

DU PONT ANTIOCH VINEYARD DIVESTITURE, Antioch, California

BORING LOCATION: Vineyard Divestiture			GROUND SURFACE ELEVATION (ft): TOP OF WELL CASING ELEVATION (ft): N/A
DRILLING AGENCY Fast-Tek	DRILLER N/A		DATE STARTED: 11/19/98 DATE FINISHED: 11/19/98
DRILLING EQUIPMENT Geoprobe			COMPLETION DEPTHS BORING: 20.0 (ft) WELL: N/A (ft)
DRILLING METHOD Geoprobe	DRILL BIT 2-1/4-in		SAMPLING METHOD: Jars and Bottles
SIZE AND TYPE OF CASING Temporary 1"-dia. Screened PVC Used for Water Sampling			NUMBER OF SAMPLES DIST.: 6 UNDIST.: 0
TYPE OF PERFORATION N/A	FROM N/A TO N/A		WATER DEPTH (ft) FIRST: 6 ∇ 24 hr.: ▼
SIZE AND TYPE OF PACK N/A	FROM N/A TO N/A		LOGGED BY A.Giangerelli CHECKED BY A.Ridley

TYPE OF SEAL	TYPE	FR	TO	TYPE	FR	TO
	No. 1: Portland Cement/Bentonite Mix	0	20'	No. 3: N/A	N/A	N/A
	No. 2: N/A	N/A	N/A	No. 4: N/A	N/A	N/A

LOG OF ANT-S-DV-19

(Sheet 1 of 1)

DEPTH (feet)	SOIL GRAPHIC	MATERIAL DESCRIPTION	ELEVATION (feet)	WELL GRAPHIC	OVM Reading (soil),ppm	OVM Reading (airspace),ppm	WATER LEVEL	DEPTH (feet)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES POCKET PEN (tsf)	SAMPLES BLOWS/ foot	INDEX PROPERTIES MOISTURE CONTENT (%)	INDEX PROPERTIES DRY DENSITY (pcf)	INDEX PROPERTIES UNCONFINED COMPRESSIVE STRENGTH (psf)	NOTES
0	▨	**Silty SAND (SM)** Damp, some roots		▨												Start 1530
5	▨	**Silty SAND (SM)** Wet, some fines		▨			∇	5								
10	▨			▨				10								
15	▨			▨				15								
20		BOTTOM OF BORING AT 20 FEET						20								
25								25								

URS Greiner Woodward Clyde PROJECT NO. 40-D6AN8078.00 LOG: 19

Appendix C

EDR Report

Appendix C
EDR Report

The EDR-Radius Map
with GeoCheck®

DuPont Vineyard Buffer Zone
6000 Bridgehead Rd
Oakley, CA 94561

Inquiry Number: 0330868.1r

January 22, 1999

EDR® Environmental Data Resources, Inc.
an edr company

The Source
For Environmental
Risk Management
Data

3530 Post Road
Southport, Connecticut 06490

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edrnet.com

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APPENDICES

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc. (EDR). The report meets the government records search requirements of ASTM Standard Practice for Environmental Site Assessments, E 1527-97. Search distances are per ASTM standard or custom distances requested by the user.

The address of the subject property for which the search was intended is:

6000 BRIDGEHEAD RD
OAKLEY, CA 94561

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the subject property or within the ASTM E 1527-97 search radius around the subject property for the following Databases:

NPL:________________ National Priority List
Delisted NPL:__________ NPL Deletions
AWP:_______________ AWP
Notify 65:____________ Notify 65
Toxic Pits:___________ Toxic Pits
CERCLIS:____________ Comprehensive Environmental Response, Compensation, and Liability Information System
SWF/LF:_____________ State Landfill
AST:_______________ Aboveground Petroleum Storage Tank Facilities
RAATS:_____________ RCRA Administrative Action Tracking System
HAZNET:____________ HAZNET
RCRIS-SQG:__________ Resource Conservation and Recovery Information System
HMIRS:_____________ Hazardous Materials Information Reporting System
PADS:______________ PCB Activity Database System
ERNS:______________ Emergency Response Notification System
MLTS:______________ Material Licensing Tracking System
NPL Lien:___________ NPL Liens
Ca. BEP:____________ CA Bond Exp. Plan
ROD:_______________ ROD
CONSENT:___________ Superfund (CERCLA) Consent Decrees
Ca. WDS:____________ CA WDS
S Bay Reg. 2:_________ South Bay Region 2
Coal Gas:____________ Former Manufactured gas (Coal Gas) Sites.

Unmapped (orphan) sites are not considered in the foregoing analysis.

Search Results:

Search results for the subject property and the search radius, are listed below:

Subject Property:

The subject property was identified in the following government records. For more information on this property see page 9 of the attached EDR Radius Map report:

Site	Database(s)	EPA ID
E. I. DUPONT DE NEMOURS ANTIOCH WORKS 6000 BRIDGEHEAD ROAD, ANTIOCH ANTIOCH, CA	CA SLIC	N/A

EXECUTIVE SUMMARY

E.I. DUPONT DE NEMOURS & CO. 6000 BRIDGEHEAD RD ANTIOCH, CA 94509	Ca. FID LUST	N/A
E I DU PONT DE NEMOURS ANTIOCH WKS AND CO 6000 BRIDGEHEAD RD ANTIOCH, CA 94509	FINDS RCRIS-LQG TRIS TSCA CORRACTS CERC-NFRAP RCRIS-TSD UST	CAD009151671
DUPONT DE NEMOURS & CO INC 6000 BRIDGEHEAD RD ANTIOCH, CA 94509	Cal-Sites	N/A
DUPONT CHEMICAL CO., ANTIOCH WORKS 6000 BRIDGEHEAD ROAD ANTIOCH, CA	CA SLIC	N/A
6000 BRIDGEHEAD RD 6000 BRIDGEHEAD RD ANTIOCH, CA 94509	WMUDS	N/A
DU PONT ANTIOCH WORKS 6000 BRIDGEHEAD RD ANTIOCH, CA 94509	LUST Cortese	N/A

EXECUTIVE SUMMARY

Surrounding Properties:

Elevations have been determined from the USGS 1 degree Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. EDR's definition of a site with an elevation equal to the subject property includes a tolerance of -10 feet. Sites with an elevation equal to or higher than the subject property have been differentiated below from sites with an elevation lower than the subject property (by more than 10 feet). Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold Italics*** are in multiple databases.

RCRIS: The Resource Conservation and Recovery Act database includes selected information on sites that generate, store, treat, or dispose of hazardous waste as defined by the Act. The source of this database is the U.S. EPA.

A review of the RCRIS-TSD list, as provided by EDR, and dated 07/01/1998 has revealed that there is 1 RCRIS-TSD site within approximately 0.5 miles of the subject property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
PG & E CONTRA COSTA POWER PLT	***1456 WILBUR AVE***	***1/4 - 1/2NW***	***13***	***21***

CAL-SITES: Formerly known as ASPIS, this database contains both known and potential hazardous substance sites. The source is the California Department of Toxic Substance Control.

A review of the Cal-Sites list, as provided by EDR, has revealed that there is 1 Cal-Sites site within approximately 1 mile of the subject property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
OAKLEY ROAD METERING SITE	OAKLEY RD. / PHILLIPS	1/2 - 1 SW	18	26

CHMIRS: The California Hazardous Material Incident Report System contains information on reported hazardous material incidents, i.e., accidental releases or spills. The source is the California Office of Emergency Services.

A review of the CHMIRS list, as provided by EDR, and dated 12/31/1994 has revealed that there is 1 CHMIRS site within approximately 1 mile of the subject property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
Not reported	BONANZA INDUSTRIES, HWY	1/4 - 1/2WSW	12	21

CORTESE: This database identifies public drinking water wells with detectable levels of contamination, hazardous substance sites selected for remedial action, sites with known toxic material identified through the abandoned site assessment program, sites with USTs having a reportable release and all solid waste disposal facilities from which there is known migration. The source is the California Environmental Protection Agency/Office of Emergency Information.

A review of the Cortese list, as provided by EDR, has revealed that there are 4 Cortese sites within approximately 1 mile of the subject property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
CHEVRON #9-3801	***5433 NEROLY RD***	***1/4 - 1/2SSW***	***14***	***23***

EXECUTIVE SUMMARY

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
PECKHAM PROPERTY	*3215 18TH ST E*	*1/2 - 1 WSW*	*15*	*24*
ANTIOCH PAVING CO INC	*WILBUR AVE 2540*	*1/2 - 1 WNW*	*17*	*25*

Lower Elevation	Address	Dist / Dir	Map ID	Page
BIG BREAK MARINA	*100 BIG BREAK RD*	*1/2 - 1 ENE*	*16*	*24*

CORRACTS: CORRACTS is a list of handlers with RCRA Corrective Action Activity. This report shows which nationally-defined corrective action core events have occurred for every handler that has had corrective action activity.

A review of the CORRACTS list, as provided by EDR, and dated 06/30/1998 has revealed that there is 1 CORRACTS site within approximately 1 mile of the subject property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
PG & E CONTRA COSTA POWER PLT	*1456 WILBUR AVE*	*1/4 - 1/2NW*	*13*	*21*

LUST: The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the State Water Resources Control Board Leaking Underground Storage Tank Information System.

A review of the LUST list, as provided by EDR, and dated 08/01/1998 has revealed that there is 1 LUST site within approximately 0.5 miles of the subject property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
CHEVRON #9-3801	*5433 NEROLY RD*	*1/4 - 1/2SSW*	*14*	*23*

UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the State Water Resources Control Board's Hazardous Substance Storage Container Database.

A review of the UST list, as provided by EDR, and dated 10/15/1990 has revealed that there is 1 UST site within approximately 0.25 miles of the subject property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
DRIFTWOOD MARINA	BRIDGEHEAD ROAD	1/8 - 1/4WSW	B11	20

CA FID: The Facility Inventory Database contains active and inactive underground storage tank locations. The source is the State Water Resource Control Board.

A review of the Ca. FID list, as provided by EDR, has revealed that there are 2 Ca. FID sites within approximately 0.25 miles of the subject property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
NEWBRIDGE MARINA INC	6325 BRIDGEHEAD RD	1/8 - 1/4WSW	B9	20
DRIFTWOOD MARINA	*6338 BRIDGEHEAD RD*	*1/8 - 1/4WSW*	*B10*	*20*

EXECUTIVE SUMMARY

SL:Lists includes sites from the Underground Tank Program, Hazardous Waste Generator Program & Business Plan 12185 Program

A review of the Ca. SL list, as provided by EDR, has revealed that there are 2 Ca. SL sites within approximately 0.25 miles of the subject property.

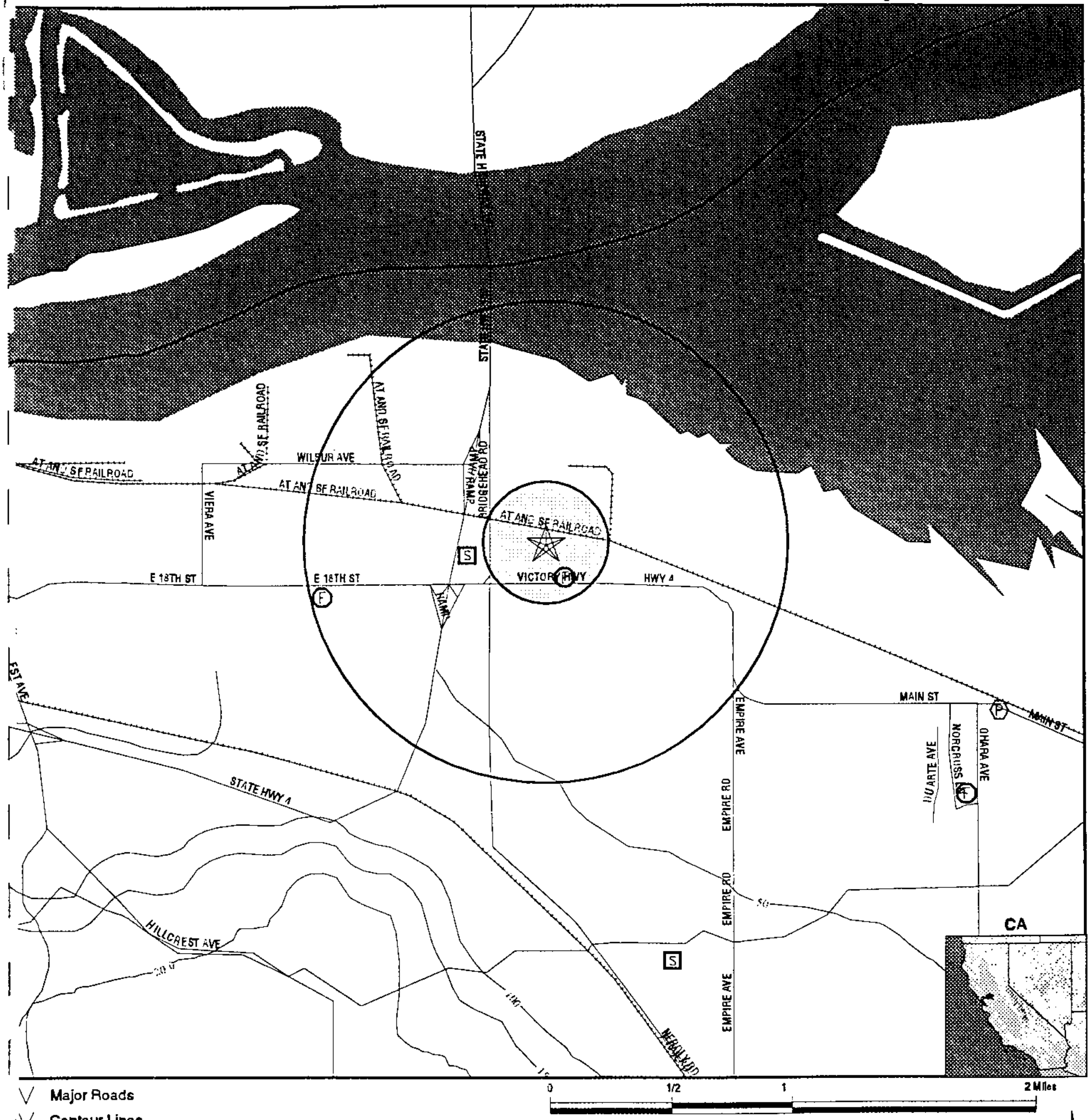
Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
NEW BRIDGE MARINA INC	BRIDGEHEAD RD 6325	1/8 - 1/4 WSW	B8	19
DRIFTWOOD MARINA	*6338 BRIDGEHEAD RD*	*1/8 - 1/4 WSW*	*B10*	*20*

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped:

Site Name	Database(s)
GEOTHERMAL INDUSTRIES INC	RCRIS-SQG,FINDS,CORRACTS CERC-NFRAP,RCRIS-TSD
ANTIOCH A B F	Cal-Sites
TWITCHELL ISLAND	Cal-Sites
BRIDGEHEAD INC	LUST
ANTIOCH AIRPORT	UST
ARNOLD HOLUB	UST
HEIDRON FARM	UST
INDUSTRIAL OIL COMPANY	UST
BRIDGEHEAD TRUCK STOP	UST
96946	UST
J.J. LEWIS RANCH	UST
C.C.W.D. ANTIOCH OPERATIONS CT	UST
DAVID J. BLUMEN	UST
GUIDO LUCCHESI	UST
IRVINR & CAROLYN L. SHERMAN	UST
JACUZZI RANCH	UST
ROY & RALPH LUCCHESI	UST
STONEBARGER RANCH	UST
VICTOR PATO	UST
ELMER JOHNSON	UST
EVO BALDOCCHI	UST
HOOVER E. KENNEDY	UST
JOHN V. DEJESUS	UST
WINDSWEPT LIVESTOCK CO	UST,Ca. SL
TINO BACCHINI RANCH	UST
SHERMAN ISL. DEHYDRATOR-ODORAN	UST
CHEVRON SS# 96946	Ca. FID,Ca. SL
1X BRIDGEHEAD INC	HAZNET
CALIFORNIA ORGANICS	RCRIS-SQG,FINDS
NGC-CESA #1	Ca. SL
ARCO PRODUCTS	Ca. SL
SHOSHONE OIL CORPORATION	Ca. SL
WESTERN CONT'L NGC-KYSH-1	Ca. SL

TOPOGRAPHIC MAP - 0330868.1r - URS Greiner/Woodward Clyde



- Major Roads
- Contour Lines
- Waterways
- Earthquake Fault Lines
- Earthquake epicenter, Richter 5 or greater
- Ⓕ Closest Federal Well in quadrant
- Ⓢ Closest State Well in quadrant
- Ⓟ Closest Public Water Supply Well
- (HD) Closest Hydrogeological Data
- ● Oil, gas or related wells

TARGET PROPERTY:	DuPont Vineyard Buffer Zone	CUSTOMER:	URS Greiner/Woodward Clyde
ADDRESS:	6000 Bridgehead Rd	CONTACT:	Ms April Giangerelli
CITY/STATE/ZIP:	Oakley CA 94561	INQUIRY #:	0330868.1r
LAT/LONG:	38.0077 / 121.7456	DATE:	January 22, 1999 2:32 pm

GEOCHECK VERSION 2.1
SUMMARY

TARGET PROPERTY COORDINATES

Latitude (North):	38.007702 - 38° 0' 27.7"
Longitude (West):	121.745567 - 121° 44' 44.0"
Universal Transverse Mercator:	Zone 10
UTM X (Meters):	-8246224.0
UTM Y (Meters):	19163578.0

USGS TOPOGRAPHIC MAP ASSOCIATED WITH THIS SITE

Target Property:	2438121-A6 JERSEY ISLAND, CA

GEOLOGIC AGE IDENTIFICATION†

Geologic Code:	Q
Era:	Cenozoic
System:	Quaternary
Series:	Quaternary

ROCK STRATIGRAPHIC UNIT†

Category:	Stratifed Sequence

GROUNDWATER FLOW INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, including well data collected on nearby properties, regional groundwater flow information (from deep aquifers), or surface topography.‡

AQUIFLOW™** Search Radius: 2.000 Miles

MAP ID	DISTANCE FROM TP	DIRECTION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported			

General Topographic Gradient at Target Property: General NNE

General Hydrogeologic Gradient at Target Property: The hydrogeologic gradient for this report has been determined using the depth to water table information provided below. Where available, the closest well in each quadrant has been identified (up to a radius of 5 miles around the target property) and used in the gradient calculation. While an attempt has been made to segregate shallow from deep aquifers, this cannot always be assured. Groundwater flow in the aquifer associated with the wells appears generally to be to the SSE. This would appear to be in conflict with the topographical gradient. The direction of the groundwater flow should be determined by a qualified environmental professional.

† Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).
‡ U.S. EPA Ground Water Handbook, Vol I: Ground Water and Contamination, Office of Research and development EPA/625/6-90/016a, Chapter 4, page 78, September 1990.
** EDR AQUIFLOW™ information System of hydrogeologically determined groundwater flow directions at specific locations. See the date pages at the end of this report for a complete description.

GEOCHECK VERSION 2.1
SUMMARY

Site-Specific Hydrogeological Data*:
Search Radius: 2.0 miles
Status: Not found

FEDERAL DATABASE WELL INFORMATION

WELL QUADRANT	DISTANCE FROM TP	LITHOLOGY	DEPTH TO WATER TABLE
Eastern	>2 Miles	Not Reported	36 ft.
Southern	1/8 - 1/4 Mile	Not Reported	14 ft.
Western	1/2 - 1 Mile	Sand	50 ft.

STATE DATABASE WELL INFORMATION

WELL QUADRANT	DISTANCE FROM TP
Eastern	>2 Miles
Southern	1 - 2 Miles
Western	1/4 - 1/2 Mile

STATE OIL/GAS WELL INFORMATION

API #	DISTANCE FROM TP

NO WELLS FOUND

PUBLIC WATER SUPPLY SYSTEM INFORMATION

Searched by Nearest PWS.
NOTE: PWS System location is not always the same as well location.

PWS Name:
BRIDGEHEAD RENTALS SWS
MAURICE AND GENEVA LODGE
5540 HIGHWAY
OAKLEY, CA 94561

Location Relative to TP: 1 - 2 Miles East
PWS currently has or has had major violation(s): Yes

AREA RADON INFORMATION

EPA Radon Zone for CONTRA COSTA County: 2

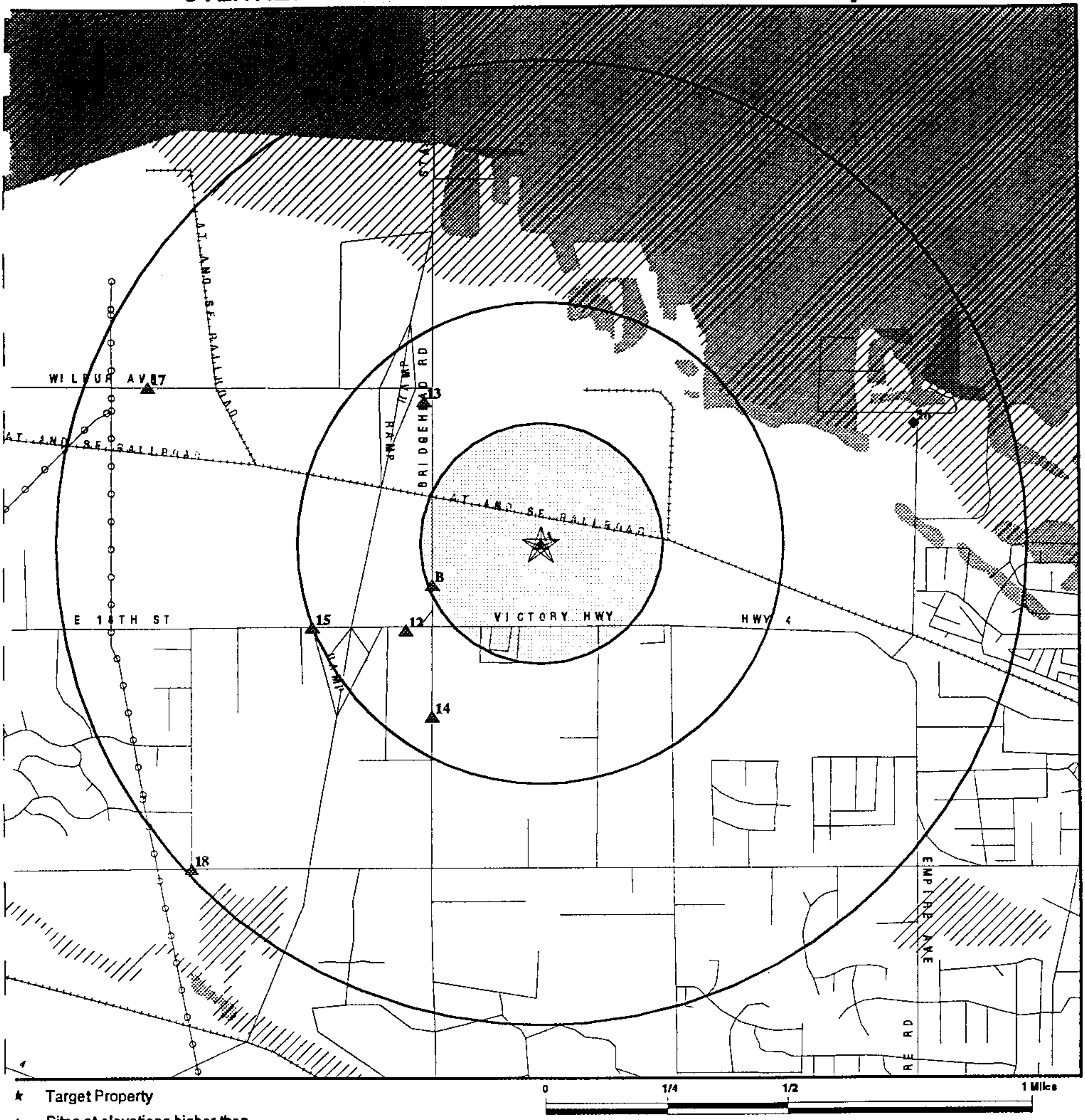
Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

CONTRA COSTA COUNTY, CA

Number of sites tested: 55

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.760 pCi/L	100%	0%	0%
Living Area - 2nd Floor	0.300 pCi/L	100%	0%	0%
Basement	0.525 pCi/L	100%	0%	0%

OVERVIEW MAP - 0330868.1r - URS Greiner/Woodward Clyde

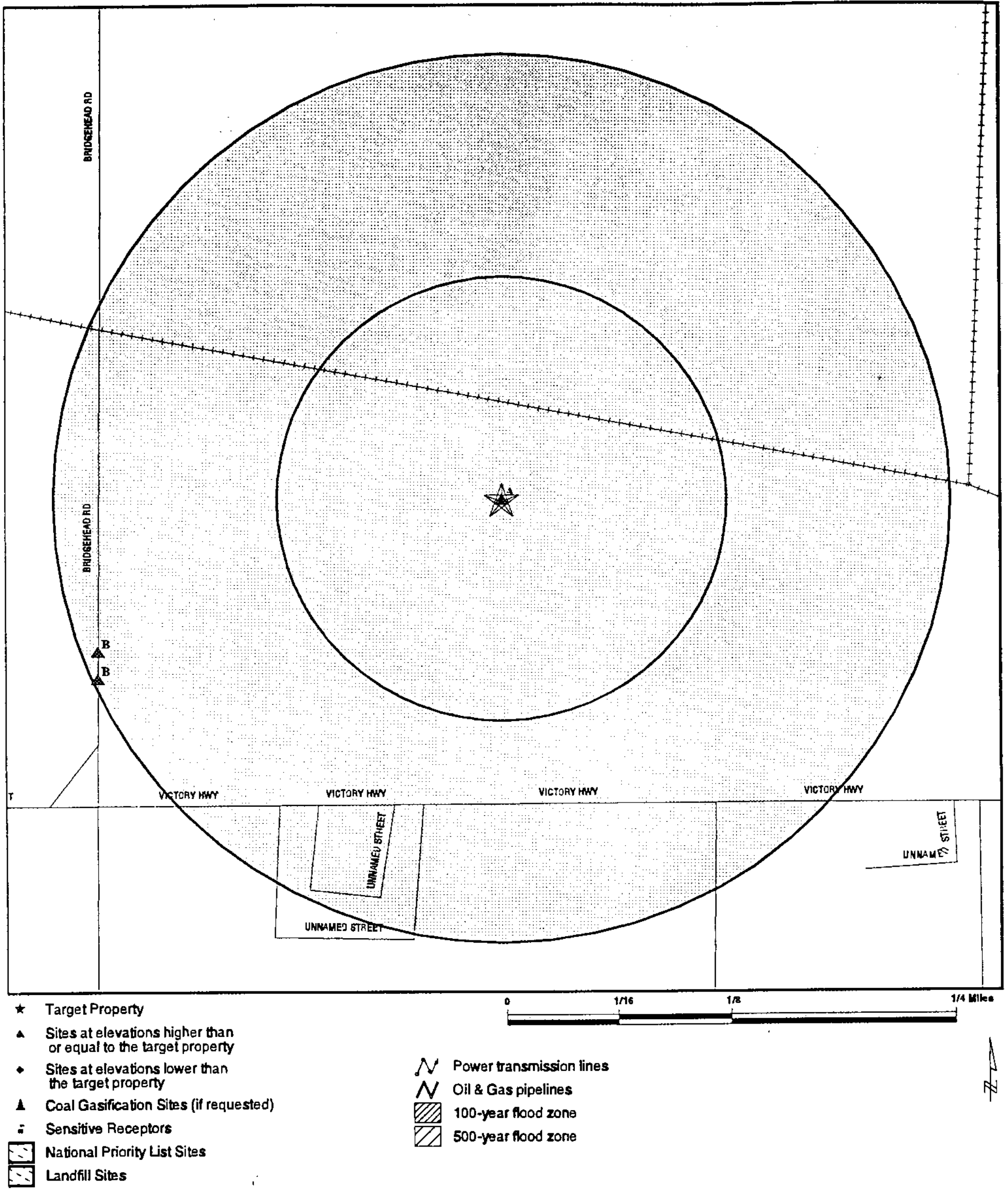


- ★ Target Property
- ▲ Sites at elevations higher than or equal to the target property
- ◆ Sites at elevations lower than the target property
- ▲ Coal Gasification Sites (if requested)
- ▭ National Priority List Sites
- ▭ Landfill Sites
- Power transmission lines
- Oil & Gas pipelines
- ▨ 100-year flood zone
- ▨ 500-year flood zone
- ▩ Wetlands per National Wetlands Inventory (1994)

TARGET PROPERTY: DuPont Vineyard Buffer Zone
ADDRESS: 6000 Bridgehead Rd
CITY/STATE/ZIP: Oakley CA 94561
LAT/LONG: 38.0077 / 121.7456

CUSTOMER: URS Greiner/Woodward Clyde
CONTACT: Ms April Giangerelli
INQUIRY #: 0330868.1r
DATE: January 22, 1999 2:27 pm

DETAIL MAP - 0330868.1r - URS Greiner/Woodward Clyde



TARGET PROPERTY:	DuPont Vineyard Buffer Zone	CUSTOMER:	URS Greiner/Woodward Clyde
ADDRESS:	6000 Bridgehead Rd	CONTACT:	Ms April Giangerelli
CITY/STATE/ZIP:	Oakley CA 94561	INQUIRY #:	0330868.1r
LAT/LONG:	38.0077 / 121.7456	DATE:	January 22, 1999 2:30 pm

MAP FINDINGS SUMMARY SHOWING ALL SITES

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
NPL		1.000	0	0	0	0	NR	0
Delisted NPL		TP	NR	NR	NR	NR	NR	0
RCRIS-TSD	X	0.500	0	0	1	NR	NR	1
AWP		1.000	0	0	0	0	NR	0
Cal-Sites	X	1.000	0	0	0	1	NR	1
Notify 65		1.000	0	0	0	0	NR	0
CHMIRS		1.000	0	0	1	0	NR	1
Cortese	X	1.000	0	0	1	3	NR	4
Toxic Pits		1.000	0	0	0	0	NR	0
CERCLIS		0.500	0	0	0	NR	NR	0
CERC-NFRAP	X	TP	NR	NR	NR	NR	NR	0
CORRACTS	X	1.000	0	0	1	0	NR	1
State Landfill		0.500	0	0	0	NR	NR	0
LUST	X	0.500	0	0	1	NR	NR	1
UST	X	0.250	0	1	NR	NR	NR	1
CA FID	X	0.250	0	2	NR	NR	NR	2
AST		TP	NR	NR	NR	NR	NR	0
RAATS		TP	NR	NR	NR	NR	NR	0
WMUDS/SWAT	X	0.500	0	0	0	NR	NR	0
HAZNET		0.250	0	0	NR	NR	NR	0
RCRIS Sm. Quan. Gen.		0.250	0	0	NR	NR	NR	0
RCRIS Lg. Quan. Gen.	X	0.250	0	0	NR	NR	NR	0
HMIRS		TP	NR	NR	NR	NR	NR	0
PADS		TP	NR	NR	NR	NR	NR	0
ERNS		TP	NR	NR	NR	NR	NR	0
FINDS	X	TP	NR	NR	NR	NR	NR	0
TRIS	X	TP	NR	NR	NR	NR	NR	0
TSCA	X	TP	NR	NR	NR	NR	NR	0
MLTS		TP	NR	NR	NR	NR	NR	0
NPL Liens		TP	NR	NR	NR	NR	NR	0
CA SLIC	X	0.500	0	0	0	NR	NR	0
CA Bond Exp. Plan		1.000	0	0	0	0	NR	0
ROD		1.000	0	0	0	0	NR	0
CONSENT		1.000	0	0	0	0	NR	0
CA WDS		TP	NR	NR	NR	NR	NR	0
Site List		0.250	0	2	NR	NR	NR	2
South Bay Region 2		TP	NR	NR	NR	NR	NR	0
Coal Gas		1.000	0	0	0	0	NR	0

TP = Target Property

NR = Not Requested at this Search Distance

* Sites may be listed in more than one database

MAP FINDINGS SUMMARY SHOWING ONLY SITES HIGHER THAN OR THE SAME ELEVATION AS TP

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
NPL		1.000	0	0	0	0	NR	0
Delisted NPL		TP	NR	NR	NR	NR	NR	0
RCRIS-TSD	X	0.500	0	0	1	NR	NR	1
AWP		1.000	0	0	0	0	NR	0
Cal-Sites	X	1.000	0	0	0	1	NR	1
Notify 65		1.000	0	0	0	0	NR	0
CHMIRS		1.000	0	0	1	0	NR	1
Cortese	X	1.000	0	0	1	2	NR	3
Toxic Pits		1.000	0	0	0	0	NR	0
CERCLIS		0.500	0	0	0	NR	NR	0
CERC-NFRAP	X	TP	NR	NR	NR	NR	NR	0
CORRACTS	X	1.000	0	0	1	0	NR	1
State Landfill		0.500	0	0	0	NR	NR	0
LUST	X	0.500	0	0	1	NR	NR	1
UST	X	0.250	0	1	NR	NR	NR	1
CA FID	X	0.250	0	2	NR	NR	NR	2
AST		TP	NR	NR	NR	NR	NR	0
RAATS		TP	NR	NR	NR	NR	NR	0
WMUDS/SWAT	X	0.500	0	0	0	NR	NR	0
HAZNET		0.250	0	0	NR	NR	NR	0
RCRIS Sm. Quan. Gen.		0.250	0	0	NR	NR	NR	0
RCRIS Lg. Quan. Gen.	X	0.250	0	0	NR	NR	NR	0
HMIRS		TP	NR	NR	NR	NR	NR	0
PADS		TP	NR	NR	NR	NR	NR	0
ERNS		TP	NR	NR	NR	NR	NR	0
FINDS	X	TP	NR	NR	NR	NR	NR	0
TRIS	X	TP	NR	NR	NR	NR	NR	0
TSCA	X	TP	NR	NR	NR	NR	NR	0
MLTS		TP	NR	NR	NR	NR	NR	0
NPL Liens		TP	NR	NR	NR	NR	NR	0
CA SLIC	X	0.500	0	0	0	NR	NR	0
CA Bond Exp. Plan		1.000	0	0	0	0	NR	0
ROD		1.000	0	0	0	0	NR	0
CONSENT		1.000	0	0	0	0	NR	0
CA WDS		TP	NR	NR	NR	NR	NR	0
Site List		0.250	0	2	NR	NR	NR	2
South Bay Region 2		TP	NR	NR	NR	NR	NR	0
Coal Gas		1.000	0	0	0	0	NR	0

TP = Target Property

NR = Not Requested at this Search Distance

* Sites may be listed in more than one database

Coal Gas Site Search: No site was found in a search of Real Property Scan's ENVIROHAZ database.

A5 Target Property	**E. I. DUPONT DE NEMOURS ANTIOCH WORKS 6000 BRIDGEHEAD ROAD, ANTIOCH ANTIOCH, CA**	**CA SLIC**	**S102680597 N/A**

A6 Target Property	**E.I. DUPONT DE NEMOURS & CO. 6000 BRIDGEHEAD RD ANTIOCH, CA 94509**	**Ca. FID LUST**	**S101580703 N/A**

FID:

Facility ID:	07000002	Regulate ID:	CAD009151
Reg By:	Active Underground Storage Tank Location		
Cortese Code:	Not reported	SIC Code:	Not reported
Status:	Active	Facility Tel:	(415) 757-1210
Mail To:	Not reported 6000 BRIDGEHEAD RD ANTIOCH, CA 94509		
Contact:	Not reported	Contact Tel:	Not reported
DUNs No:	Not reported	NPDES No:	Not reported
Creation:	10/22/93	Modified:	00/00/00
EPA ID:	Not reported		
Comments:	Not reported		

A7 Target Property	**E I DU PONT DE NEMOURS ANTIOCH WKS AND CO 6000 BRIDGEHEAD RD ANTIOCH, CA 94509**	**FINDS RCRIS-LQG TRIS TSCA CORRACTS CERC-NFRAP RCRIS-TSD UST**	**1000111309 CAD009151671**

CERCLIS-NFRAP Classification Data:

Site Incident Category:	Not reported	Federal Facility:	Not a Federal Facility
Ownership Status:	Private	NPL Status:	Not on the NPL

CERCLIS-NFRAP Assessment History:

Assessment:	DISCOVERY	Completed:	01-NOV-79
Assessment:	PRELIMINARY ASSESSMENT	Completed:	01-MAR-85
Assessment:	SITE INSPECTION	Completed:	01-MAR-85
Assessment:	PRELIMINARY ASSESSMENT	Completed:	23-NOV-88
Assessment:	PRELIMINARY ASSESSMENT	Completed:	13-SEP-90

CERCLIS-NFRAP Alias Name(s):
DUPONT ANTIOCH WORKS

CORRACTS Data:

Prioritization:	High
Status:	RCRA Facility Assessment Completed, RFI Workplan Approved, RCRA Facility Investigation Approved, Stabilization Measures Implemented, Stabilization Construction Completed

RCRIS Corrective Action Summary:

Effective Date:	01/01/1983
Legal Authority:	Other, specified by Legal Authority Citation
Effective Date:	07/20/1994
Legal Authority:	Other, specified by Legal Authority Citation

E I DU PONT DE NEMOURS ANTIOCH WKS AND CO (Continued) **1000111309**

RCRIS:

Owner: E I DU PONT DE NEMOURS & CO INC
(302) 774-3788

Contact: ENVIRONMENTAL MANAGER
(415) 779-6371

Record Date: 09/01/1996

Classification: Large Quantity Generator

BIENNIAL REPORTS:

Last Biennial Reporting Year: 1995

Waste	Quantity (Lbs)	Waste	Quantity (Lbs)
D001	4678.00	D002	75353800.00
D004	1073800.00	D006	2928.00
D007	45800000.00	D008	2428.00
D009	4200.00	D018	2428.00
D019	1130710.00	D035	2428.00
F001	900.00	F002	7150.00
F003	900.00	F005	900.00
F039	321650.00	U002	100.00
U075	21160.00	U079	7620.00
U080	200.00	U121	40440.00
U154	6050.00	U211	5850.00
U220	100.00		

Used Oil Recyc: No

Violation Status: Violations exist

There are 22 violation record(s) reported at this site:

Evaluation	Area of Violation	Date of Compliance
Compliance Evaluation Inspection (CEI)	Generator-All Requirements	05/14/1996
	Generator-All Requirements	05/14/1996
	TSD-Other Requirements	06/14/1996
Compliance Evaluation Inspection (CEI)	TSD-Other Requirements	09/28/1994
	TSD-Other Requirements	09/28/1994
	Generator-All Requirements	11/03/1994
	TSD-Other Requirements	11/03/1994
Compliance Evaluation Inspection (CEI)	Generator-All Requirements	11/03/1994
	TSD-Other Requirements	11/03/1994
	TSD-Other Requirements	09/28/1994
Compliance Evaluation Inspection (CEI)	TSD-Other Requirements	01/11/1991
Compliance Evaluation Inspection (CEI)	TSD-Other Requirements	12/11/1990
	TSD-Other Requirements	12/11/1990
	TSD-Closure/Post Closure Requirements	12/11/1990
Compliance Evaluation Inspection (CEI)	TSD-Other Requirements	01/11/1991
	TSD-Closure/Post Closure Requirements	12/11/1990
Financial Record Review (FRR)	TSD-Financial Responsibility Requirements	03/21/1989
Other Evaluation	TSD-Land Ban Requirements	03/21/1989
	Generator-Land Ban Requirements	03/21/1989
Compliance Evaluation Inspection (CEI)	TSD-Other Requirements	03/21/1989

E I DU PONT DE NEMOURS ANTIOCH WKS AND CO (Continued) **1000111309**

TSD-Closure/Post Closure Requirements 03/21/1989
TSD-Groundwater Monitoring Requirements 03/21/1989

FINDS:
Other Pertinent Environmental Activity Identified at Site:
- Facility has an active water discharge permit (under PCS)
- Facility is monitored or permitted for air emissions under the Clean Air Act (under AFS/AIRS)

State UST:

Facility ID:	8471		
Tank Num:	1	Container Num:	101
Tank Capacity:	751000	Year Installed:	1969
Tank Used for:	WASTE		
Type of Fuel:	Not Reported	Tank Constrctn:	4 inches
Leak Detection:	None		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Total Tanks:	28	Region:	Not reported
Facility Type:	2	Other Type:	CHEMICAL MFG.

Facility ID:	8471		
Tank Num:	2	Container Num:	102
Tank Capacity:	2478000	Year Installed:	1971
Tank Used for:	WASTE		
Type of Fuel:	Not Reported	Tank Constrctn:	4 inches
Leak Detection:	None		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Total Tanks:	28	Region:	Not reported
Facility Type:	2	Other Type:	CHEMICAL MFG.

Facility ID:	8471		
Tank Num:	3	Container Num:	103
Tank Capacity:	2260000	Year Installed:	1972
Tank Used for:	WASTE		
Type of Fuel:	Not Reported	Tank Constrctn:	4 inches
Leak Detection:	None		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Total Tanks:	28	Region:	Not reported
Facility Type:	2	Other Type:	CHEMICAL MFG.

Facility ID:	8471		
Tank Num:	4	Container Num:	104
Tank Capacity:	1870000	Year Installed:	1956
Tank Used for:	WASTE		
Type of Fuel:	Not Reported	Tank Constrctn:	120 inches
Leak Detection:	None		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Total Tanks:	28	Region:	Not reported
Facility Type:	2	Other Type:	CHEMICAL MFG.

E I DU PONT DE NEMOURS ANTIOCH WKS AND CO (Continued) **1000111309**

Facility ID:	8471		
Tank Num:	5	Container Num:	105
Tank Capacity:	1870000	Year Installed:	1956
Tank Used for:	WASTE		
Type of Fuel:	Not Reported	Tank Constrctn:	120 inches
Leak Detection:	None		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Total Tanks:	28	Region:	Not reported
Facility Type:	2	Other Type:	CHEMICAL MFG.

Facility ID:	8471		
Tank Num:	6	Container Num:	106
Tank Capacity:	1500	Year Installed:	1956
Tank Used for:	WASTE		
Type of Fuel:	Not Reported	Tank Constrctn:	6 inches
Leak Detection:	None		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Total Tanks:	28	Region:	Not reported
Facility Type:	2	Other Type:	CHEMICAL MFG.

Facility ID:	8471		
Tank Num:	7	Container Num:	107
Tank Capacity:	3800	Year Installed:	1972
Tank Used for:	WASTE		
Type of Fuel:	Not Reported	Tank Constrctn:	8 inches
Leak Detection:	None		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Total Tanks:	28	Region:	Not reported
Facility Type:	2	Other Type:	CHEMICAL MFG.

Facility ID:	8471		
Tank Num:	8	Container Num:	111
Tank Capacity:	1400	Year Installed:	1974
Tank Used for:	WASTE		
Type of Fuel:	Not Reported	Tank Constrctn:	6 inches
Leak Detection:	None		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Total Tanks:	28	Region:	Not reported
Facility Type:	2	Other Type:	CHEMICAL MFG.

Facility ID:	8471		
Tank Num:	9	Container Num:	112
Tank Capacity:	6227	Year Installed:	1956
Tank Used for:	Not Reported		
Type of Fuel:	Not Reported	Tank Constrctn:	10 inches
Leak Detection:	None		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Total Tanks:	28	Region:	Not reported
Facility Type:	2	Other Type:	CHEMICAL MFG.

E I DU PONT DE NEMOURS ANTIOCH WKS AND CO (Continued) **1000111309**

Facility ID:	8471		
Tank Num:	10	Container Num:	113
Tank Capacity:	19400	Year Installed:	1967
Tank Used for:	Not Reported		
Type of Fuel:	Not Reported	Tank Constrctn:	10 inches
Leak Detection:	None		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Total Tanks:	28	Region:	Not reported
Facility Type:	2	Other Type:	CHEMICAL MFG.

Facility ID:	8471		
Tank Num:	11	Container Num:	114
Tank Capacity:	48800	Year Installed:	1965
Tank Used for:	Not Reported		
Type of Fuel:	Not Reported	Tank Constrctn:	12 inches
Leak Detection:	None		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Total Tanks:	28	Region:	Not reported
Facility Type:	2	Other Type:	CHEMICAL MFG.

Facility ID:	8471		
Tank Num:	12	Container Num:	115
Tank Capacity:	4320	Year Installed:	1956
Tank Used for:	Not Reported		
Type of Fuel:	Not Reported	Tank Constrctn:	8 inches
Leak Detection:	None		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Total Tanks:	28	Region:	Not reported
Facility Type:	2	Other Type:	CHEMICAL MFG.

Facility ID:	8471		
Tank Num:	13	Container Num:	201
Tank Capacity:	2400	Year Installed:	1961
Tank Used for:	WASTE		
Type of Fuel:	Not Reported	Tank Constrctn:	2 inches
Leak Detection:	None		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Total Tanks:	28	Region:	Not reported
Facility Type:	2	Other Type:	CHEMICAL MFG.

Facility ID:	8471		
Tank Num:	14	Container Num:	202
Tank Capacity:	540	Year Installed:	1979
Tank Used for:	WASTE		
Type of Fuel:	Not Reported	Tank Constrctn:	0.5 inches
Leak Detection:	None		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Total Tanks:	28	Region:	Not reported
Facility Type:	2	Other Type:	CHEMICAL MFG.

E I DU PONT DE NEMOURS ANTIOCH WKS AND CO (Continued) **1000111309**

Facility ID:	8471		
Tank Num:	15	Container Num:	301
Tank Capacity:	1000000	Year Installed:	1962
Tank Used for:	WASTE		
Type of Fuel:	Not Reported	Tank Constrctn:	Not reported
Leak Detection:	None		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Total Tanks:	28	Region:	Not reported
Facility Type:	2	Other Type:	CHEMICAL MFG.

Facility ID:	8471		
Tank Num:	16	Container Num:	302
Tank Capacity:	1000000	Year Installed:	1965
Tank Used for:	WASTE		
Type of Fuel:	Not Reported	Tank Constrctn:	Not reported
Leak Detection:	None		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Total Tanks:	28	Region:	Not reported
Facility Type:	2	Other Type:	CHEMICAL MFG.

Facility ID:	8471		
Tank Num:	17	Container Num:	303
Tank Capacity:	42500	Year Installed:	1982
Tank Used for:	WASTE		
Type of Fuel:	Not Reported	Tank Constrctn:	8 inches
Leak Detection:	None		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Total Tanks:	28	Region:	Not reported
Facility Type:	2	Other Type:	CHEMICAL MFG.

Facility ID:	8471		
Tank Num:	18	Container Num:	304
Tank Capacity:	35400	Year Installed:	1971
Tank Used for:	WASTE		
Type of Fuel:	Not Reported	Tank Constrctn:	8 inches
Leak Detection:	None		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Total Tanks:	28	Region:	Not reported
Facility Type:	2	Other Type:	CHEMICAL MFG.

Facility ID:	8471		
Tank Num:	19	Container Num:	305
Tank Capacity:	4300	Year Installed:	1962
Tank Used for:	WASTE		
Type of Fuel:	Not Reported	Tank Constrctn:	10 inches
Leak Detection:	None		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Total Tanks:	28	Region:	Not reported
Facility Type:	2	Other Type:	CHEMICAL MFG.

E I DU PONT DE NEMOURS ANTIOCH WKS AND CO (Continued) **1000111309**

Facility ID:	8471		
Tank Num:	20	Container Num:	306
Tank Capacity:	1300	Year Installed:	1984
Tank Used for:	WASTE		
Type of Fuel:	Not Reported	Tank Constrctn:	3/8 inches
Leak Detection:	None		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Total Tanks:	28	Region:	Not reported
Facility Type:	2	Other Type:	CHEMICAL MFG.

Facility ID:	8471		
Tank Num:	21	Container Num:	307
Tank Capacity:	6000	Year Installed:	1962
Tank Used for:	WASTE		
Type of Fuel:	Not Reported	Tank Constrctn:	10 inches
Leak Detection:	None		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Total Tanks:	28	Region:	Not reported
Facility Type:	2	Other Type:	CHEMICAL MFG.

Facility ID:	8471		
Tank Num:	22	Container Num:	308
Tank Capacity:	6988	Year Installed:	1963
Tank Used for:	PRODUCT		
Type of Fuel:	Not Reported	Tank Constrctn:	0.25 inches
Leak Detection:			
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Total Tanks:	28	Region:	Not reported
Facility Type:	2	Other Type:	CHEMICAL MFG.

Facility ID:	8471		
Tank Num:	23	Container Num:	401
Tank Capacity:	420	Year Installed:	1956
Tank Used for:	WASTE		
Type of Fuel:	Not Reported	Tank Constrctn:	6 inches
Leak Detection:	None		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Total Tanks:	28	Region:	Not reported
Facility Type:	2	Other Type:	CHEMICAL MFG.

Facility ID:	8471		
Tank Num:	24	Container Num:	402
Tank Capacity:	25000	Year Installed:	1956
Tank Used for:	PRODUCT		
Type of Fuel:	Not Reported	Tank Constrctn:	5/16 inches
Leak Detection:	None		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Total Tanks:	28	Region:	Not reported
Facility Type:	2	Other Type:	CHEMICAL MFG.

E I DU PONT DE NEMOURS ANTIOCH WKS AND CO (Continued) **1000111309**

Facility ID:	8471		
Tank Num:	25	Container Num:	403
Tank Capacity:	1000	Year Installed:	1962
Tank Used for:	PRODUCT		
Type of Fuel:	DIESEL	Tank Constrctn:	0.25 inches
Leak Detection:	Stock Inventor		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Total Tanks:	28	Region:	Not reported
Facility Type:	2	Other Type:	CHEMICAL MFG.

Facility ID:	8471		
Tank Num:	26	Container Num:	404
Tank Capacity:	515	Year Installed:	1979
Tank Used for:	PRODUCT		
Type of Fuel:	UNLEADED	Tank Constrctn:	12 gauge
Leak Detection:	Stock Inventor		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Total Tanks:	28	Region:	Not reported
Facility Type:	2	Other Type:	CHEMICAL MFG.

Facility ID:	8471		
Tank Num:	27	Container Num:	405
Tank Capacity:	5000	Year Installed:	1975
Tank Used for:	PRODUCT		
Type of Fuel:	REGULAR	Tank Constrctn:	0.25 inches
Leak Detection:	Stock Inventor		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Total Tanks:	28	Region:	Not reported
Facility Type:	2	Other Type:	CHEMICAL MFG.

Facility ID:	8471		
Tank Num:	28	Container Num:	406
Tank Capacity:	1001	Year Installed:	1962
Tank Used for:	WASTE		
Type of Fuel:	Not Reported	Tank Constrctn:	6 inches
Leak Detection:	None		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Total Tanks:	28	Region:	Not reported
Facility Type:	2	Other Type:	CHEMICAL MFG.

A4	**DUPONT DE NEMOURS & CO INC**	**Cal-Sites**	**S101479932**
Target	**6000 BRIDGEHEAD RD**		**N/A**
Property	**ANTIOCH, CA 94509**		

DUPONT DE NEMOURS & CO INC (Continued) **S101479932**

CAL-SITES:
Facility ID 07280084
Status: REFRC
Status Date: 07/29/1994
Lead: Not reported
Region: 2 - BERKELEY
Branch: NC - NORTH COAST
File Name: Not reported
Status Name: PROPERTY/SITE REFERRED TO RCRA
Lead Agancy: N/A
NPL: Not reported
SIC: 28 MANU - CHEMICALS & ALLIED PRODUCTS
Facility Type: Not reported
Facility Type Name: N/A
Staff Member Responsible for Site: Not reported
Supervisor Responsible for Site: Not reported
Region Water Control Board: CV - CENTRAL VALLEY
Access: Not reported
Cortese: Not reported
Hazardous Ranking Score: Not reported
Date Site Hazard Ranked: Not reported
Groundwater Contamination: Not reported
No. of Contamintion Sources: 0
Lat/Long: Not reported
Lat/long Method: Not reported
State Assembly District Code: Not reported
State Senate District: Not reported
Activity: DISCOVERY
Activity Status: PROPERTY/SITE REFERRED TO RCRA
Background: Not reported
Alternative Name: UPONT DE NEMOURS & CO INC
Alternative Addr: 6000 BRIDGEHEAD ROAD
ANTIOCH, CA 94509
Alternative Name: I DUPONT DE NEMOURS ANTIOCH WORKS
Alternative Addr: 6000 BRIDGEHEAD ROAD
ANTIOCH, CA 94509
Alternative Name: HELL OIL
Alternative Addr: 6000 BRIDGEHEAD ROAD
ANTIOCH, CA 94509
Comment Date: 04/01/1979
Comment: FACILITY IDENTIFIED ON ECKHARDT SURVEY
WADE'S QUESTIONNAIRE SENT
WADE'S QUESTIONNAIRE RECEIVED

A1 **DUPONT CHEMICAL CO., ANTIOCH WORKS** **CA SLIC** **S103366877**
Target **6000 BRIDGEHEAD ROAD** **N/A**
Property **ANTIOCH, CA**

SLIC Region 5:
Facility Status: Rf, REM
Pollutant: PCE,TCE, DCE, other VOCs, Pb, As, benzUnie, freon 113 SLIC
Date Filed: Not reported Report Date: A
Lead Agancy: KHC

A2 **WMUDS** **S103320042**
Target **6000 BRIDGEHEAD RD** **N/A**
Property **ANTIOCH, CA 94509**

WMUDS:
Region: 5S
Total Tanks: Not reported
Date of Last Facility Edit: Not reported
Last Facility Editors: Not reported
Waste Discharge System ID: 5B072038001
Solid Waste Information ID: Not reported
Waste Discharge System: True
Solid Waste Assessment Test Program: False
Toxic Pits Cleanup Act Program: False
Resource Conservation Recovery Act Program: True
Department of Defense: Not reported
Open to Public: False
Number of WMUDS at Facility: 1
Facility Contact: ROBERT DOREMUS, JR.
Facility Telephone: (925) 779-6265
Primary Standard Industrial Classification: 2816
Secondary Standard Industrial Classification: Not reported
Solid Waste Assessment Test Program Name: Not reported
Threat to Water Quality: Moderate Threat to Water Quality. A violation could have a major advers
NPID: CA0004936
Tonnage: 0
Regional Board ID: Not reported
Municipal Solid Waste: False
Superorder: Not reported
Sub Chapter 15: True
Reg. Board Progject Officer: JEM
Section Range: Not reported
RCRA Facility: Yes
Waste Discharge Requirements: A
Base Meridian: Not reported
Waste List: Not reported
Facility Name: ANTIOCH FACILITY
Facility Description: Not reported
Self-Monitoring Rept. Frequency: Monthly Sumittal
Facility Type: Industrial - Facility that treats and/or disposes of liquid or semisolid wastes from any servicing, producing, manufacturing or processing operation of whatever nature, including mining, gravel washing, geothermal operations, air conditioning, ship building and repairing, oil production, storage and disposal operations, water pumping.
Complexity: Category A - Any major NPDES facility, any non-NPDES facility (particularly those with toxic wastes) that would be a major if discharge was made to surface or ground waters, or any Class I disposal site. Includes any small-volume complex facility (particularly those with toxicwastes) with numerous discharge points, leak detection systems or ground water monitoring wells.
Prime Waste: Process Waste (Waste produced as part of the industrial/manufacturing process) - Designated/Influent or Solid Wastes that pose a significant threat to water quality because of their high concentrations (E.G., BOD, Hardness, TRF, Chloride). 'Manageable' hazardous wastes (E.G., inorganic salts and heavy metals) are included in this category.

(Continued) **S103320042**

2nd Waste Type: Domestic Sewage - Designated/Influent or Solid Wastes that pose a significant threat to water quality because of their high concentrations (E.G., BOD, Hardness, TRF, Chloride). 'Manageable' hazardous wastes (E.G., inorganic salts and heavy metals) are included in this category.
Agency: E.I. DU PONT DE NEMOURS & CO.
Agency Addr: ANTIOCH, CA 94509
Agency Dept: Not reported
Agency Contact: ROBERT DOREMUS, JR.
Agency Tele: (925) 779-6265
Agency Type: Private
Landowner: Not reported
Landowner Addr: Not reported
Landowner Cont: Not reported
Landowner Tele: Not reported

A3
Target
Property

DU PONT ANTIOCH WORKS
6000 BRIDGEHEAD RD
ANTIOCH, CA 94509

LUST
Cortese

S100424307
N/A

State LUST:

Facility Type	ACTIVE	Cross Street:	WILBUR
Reg Board:	Central Valley Region	Qty Leaked:	1
Chemical:	Unleaded Gasoline		
Lead Agency:	Regional Board		
Case Type:	Aquifer affected		
Status:	Preliminary site assessment workplan submitted		
Review Date:	12/16/1997	Confirm Leak:	Not reported
Workplan:	08/18/1987	Prelim Assess:	Not reported
Pollution Char:	Not reported	Remed Plan:	Not reported
Remed Action:	Not reported	Monitoring:	Not reported
Close Date:	Not reported	Release Date:	08/21/1986

LUST Region 5:

Respble Party:	E.I. DU PONT DE NEMOURS & CO.	Substance:	UNLEAD GASOLINE
Case Type:	Aquifer affected		
Pilot Program:	No		
Staff Initials:	EAT	Case Number:	070004
Status:	Preliminary site assessment workplan submitted		
MTBE:	Not reported	Lead Agency:	Regional

CORTESE:
Reg By: LTNKA
Reg Id: 070004
Region: CORTESE

B8
WSW
1/8-1/4
1274
Higher

NEW BRIDGE MARINA INC
BRIDGEHEAD RD 6325
ANTIOCH, CA

Ca. SL

S102259856
N/A

NEW BRIDGE MARINA INC (Continued) **S102259856**

Contra Costa SL:
Facility ID: 70158
Telephone: (510) 757-1500
Region: CNTRACSTA
Program Status:
UST: Inactive
HWG: Not reported
BUSP: Active

B9
WSW
1/8-1/4
1274
Higher

NEWBRIDGE MARINA INC
6325 BRIDGEHEAD RD
ANTIOCH, CA 94509

Ca. FID

S101581150
N/A

FID:

Facility ID:	07001550	Regulate ID:	Not reported
Reg By:	Active Underground Storage Tank Location		
Cortese Code:	Not reported	SIC Code:	Not reported
Status:	Active	Facility Tel:	(510) 757-1500
Mail To:	Not reported PO BOX ANTIOCH, CA 94509		
Contact:	Not reported	Contact Tel:	Not reported
DUNs No:	Not reported	NPDES No:	Not reported
Creation:	10/22/93	Modified:	00/00/00
EPA ID:	Not reported		
Comments:	Not reported		

B10
WSW
1/8-1/4
1305
Higher

DRIFTWOOD MARINA
6338 BRIDGEHEAD RD
ANTIOCH, CA 94509

Ca. FID
Ca. SL

S101623503
N/A

Contra Costa SL:
Facility ID: 14099
Telephone: (510) 757-9449
Region: CNTRACSTA
Program Status:
UST: Active
HWG: Not reported
BUSP: Active

B11
WSW
1/8-1/4
1311
Higher

DRIFTWOOD MARINA
BRIDGEHEAD ROAD
ANTIOCH, CA 94509

UST

U001596219
N/A

DRIFTWOOD MARINA (Continued) **U001596219**

State UST:

Facility ID:	14099		
Tank Num:	1	Container Num:	1
Tank Capacity:	6000	Year Installed:	Not reported
Tank Used for:	PRODUCT		
Type of Fuel:	UNLEADED	Tank Constrctn:	Not reported
Leak Detection:	None		
Contact Name:	TROY ANDREWS, HARBOR MASTER	Telephone:	(415) 757-9449
Total Tanks:	0	Region:	Not reported
Facility Type:	1	Other Type:	BOAT MARINA

Facility ID:	14099		
Tank Num:	2	Container Num:	2
Tank Capacity:	6000	Year Installed:	Not reported
Tank Used for:	Not Reported		
Type of Fuel:	Not Reported	Tank Constrctn:	Not reported
Leak Detection:	None		
Contact Name:	TROY ANDREWS, HARBOR MASTER	Telephone:	(415) 757-9449
Total Tanks:	0	Region:	Not reported
Facility Type:	1	Other Type:	BOAT MARINA

Facility ID:	14099		
Tank Num:	3	Container Num:	3
Tank Capacity:	1000	Year Installed:	Not reported
Tank Used for:	Not Reported		
Type of Fuel:	Not Reported	Tank Constrctn:	Not reported
Leak Detection:	None		
Contact Name:	TROY ANDREWS, HARBOR MASTER	Telephone:	(415) 757-9449
Total Tanks:	0	Region:	Not reported
Facility Type:	1	Other Type:	BOAT MARINA

12
WSW
1/4-1/2
1757
Higher

BONANZA INDUSTRIES, HWY 4 NEAR BRIDGEHEA
OAKLEY, CA 94561

CHMIRS **S100280939**
N/A

CHMIRS:

OES Control Number:	Not reported	DOT ID:	Not reported
DOT Hazard Class:	Not Reported		
Chemical Name:	Not reported		
Extent of Release:	Not reported		
CAS Number:	Not reported	Quantity Released:	Not reported
Environmental Contamination:	None Reported	Property Use:	Not reported
Incident Date:	Not reported	Date Completed:	Not reported

13
NW
1/4-1/2
2021
Higher

PG & E CONTRA COSTA POWER PLT
1456 WILBUR AVE
ANTIOCH, CA 94509

FINDS
RCRIS-LQG
RAATS
CORRACTS
CERC-NFRAP
RCRIS-TSD
Ca. FID
Ca. SL

1000196257
CAT080011489

PG & E CONTRA COSTA POWER PLT (Continued) **1000196257**

CERCLIS-NFRAP Classification Data:
Site Incident Category: Not reported
Ownership Status: Unknown
Federal Facility: Not a Federal Facility
NPL Status: Not on the NPL

CERCLIS-NFRAP Assessment History:

Assessment:	DISCOVERY	Completed:	01-OCT-79
Assessment:	RCRA FACILITY ASSESSMENT	Completed:	25-SEP-86
Assessment:	PRELIMINARY ASSESSMENT	Completed:	01-DEC-86
Assessment:	SITE INSPECTION	Completed:	01-DEC-86
Assessment:	SITE INSPECTION	Completed:	11-OCT-91

CERCLIS-NFRAP Alias Name(s):
PG&E

CORRACTS Data:
Prioritization: Low
Status: RCRA Facility Assessment Completed

RCRIS Corrective Action Summary:
Effective Date: 02/24/1989
Legal Authority: RCRA 3008(h) or equivalent
Effective Date: 09/15/1989
Legal Authority: RCRA 3008(h) or equivalent

RCRIS:
Owner: PACIFIC GAS AND ELECTRIC COMPANY
(415) 781-4211

Contact: Not reported

Record Date: 02/02/1998

Classification: Large Quantity Generator

BIENNIAL REPORTS:
Last Biennial Reporting Year: 1995

Waste	Quantity (Lbs)	Waste	Quantity (Lbs)
D001	9902.00	D002	901.00
D007	901.00	D008	1970.00
D009	76.00	D035	450.00
F003	450.00	F005	1062.00
U151	70.00		

Used Oil Recyc: No

Violation Status: Violations exist

There are 5 violation record(s) reported at this site:

Evaluation	Area of Violation	Date of Compliance
Financial Record Review (FRR)	TSD-Financial Responsibility Requirements	
Compliance Evaluation Inspection (CEI)	TSD-Other Requirements	08/05/1991
Compliance Groundwater Monitoring Evaluation (CME)	TSD-Groundwater Monitoring Requirements	01/18/1988
Compliance Evaluation Inspection (CEI)	TSD-Other Requirements	01/18/1988
Compliance Evaluation Inspection (CEI)	TSD-Other Requirements	08/05/1991

PG & E CONTRA COSTA POWER PLT (Continued) **1000196257**

FINDS:
Other Pertinent Environmental Activity Identified at Site:
- Facility has an active water discharge permit (under PCS)
- Facility is monitored or permitted for air emissions under the Clean Air Act (under AFS/AIRS)
- Civil judicial and administrative enforcement case against facility (under DOCKET)

FID:

Facility ID:	07000076	Regulate ID:	Not reported
Reg By:	Inactive Underground Storage Tank Location		
Cortese Code:	Not reported	SIC Code:	Not reported
Status:	Inactive	Facility Tel:	(415) 757-4040
Mail To:	Not reported P O BOX ANTIOCH, CA 94509		
Contact:	Not reported	Contact Tel:	Not reported
DUNs No:	Not reported	NPDES No:	Not reported
Creation:	10/22/93	Modified:	00/00/00
EPA ID:	Not reported		
Comments:	Not reported		

Contra Costa SL:
Facility ID: 35376
Telephone: (510) 779-6500
Region: CNTRACSTA
Program Status:
UST: Inactive
HWG: Active
BUSP: Active

14
SSW
1/4-1/2
2242
Higher

CHEVRON #9-3801
5433 NEROLY RD
ANTIOCH, CA 94509

LUST
Cortese

S102427224
N/A

State LUST:

Facility Type	ACTIVE	Cross Street:	Not reported
Reg Board:	Central Valley Region	Qty Leaked:	Not reported
Chemical:	Gasoline		
Lead Agency:	Regional Board		
Case Type:	Aquifer affected		
Status:	Preliminary site assessment underway		
Review Date:	12/18/1997	Confirm Leak:	Not reported
Workplan:	Not reported	Prelim Assess:	11/23/1988
Pollution Char:	Not reported	Remed Plan:	Not reported
Remed Action:	Not reported	Monitoring:	Not reported
Close Date:	Not reported	Release Date:	11/23/1988

LUST Region 5:

Respble Party:	CHEVRON	Substance:	GASOLINE
Case Type:	Aquifer affected		
Pilot Program:	No		
Staff Initials:	EAT	Case Number:	070047
Status:	Preliminary site assessment underway		
MTBE:	1	Lead Agency:	Regional

CORTESE:
Reg By: LTNKA
Reg Id: 070047
Region: CORTESE

Map ID Direction Distance Distance (ft.) Elevation	Site	Database(s)	EDR ID Number EPA ID Number
15 **WSW** **1/2-1** **2649** **Higher**	**PECKHAM PROPERTY** **3215 18TH ST E** **ANTIOCH, CA 94509**	**LUST** **Cortese**	**S101306867** **N/A**

State LUST:

Facility Type	INACTIVE	Cross Street:	Not reported
Reg Board:	Central Valley Region	Qty Leaked:	Not reported
Chemical:	Gasoline		
Lead Agency:	Local Agency		
Case Type:	Soil only		
Status:	Signed off, remedial action completed or deemed unnecessary		
Review Date:	12/12/1997	Confirm Leak:	Not reported
Workplan:	Not reported	Prelim Assess:	Not reported
Pollution Char:	10/11/1990	Remed Plan:	Not reported
Remed Action:	Not reported	Monitoring:	Not reported
Close Date:	01/27/1997	Release Date:	10/16/1990

LUST Region 5:

Respble Party:	PECKHAM, DON	Substance:	GASOLINE
Case Type:	Soil only		
Pilot Program:	No		
Staff Initials:	EAT	Case Number:	070057
Status:	Case Closed by County/LIA or LOP		
MTBE:	Not reported	Lead Agency:	Local

CORTESE:

Reg By:	LTNKA
Reg Id:	070057
Region:	CORTESE

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16 **ENE** **1/2-1** **4273** **Lower**	**BIG BREAK MARINA** **100 BIG BREAK RD** **OAKLEY, CA 94561**	**LUST** **Ca. SL** **LUST** **Cortese**	**S100353582** **N/A**

State LUST:

Facility Type	INACTIVE	Cross Street:	Not reported
Reg Board:	Central Valley Region	Qty Leaked:	Not reported
Chemical:	Gasoline		
Lead Agency:	Regional Board		
Case Type:	Aquifer affected		
Status:	Signed off, remedial action completed or deemed unnecessary		
Review Date:	11/14/1997	Confirm Leak:	Not reported
Workplan:	Not reported	Prelim Assess:	Not reported
Pollution Char:	01/28/1992	Remed Plan:	Not reported
Remed Action:	Not reported	Monitoring:	Not reported
Close Date:	11/13/1997	Release Date:	02/05/1992

LUST Region 5:

Respble Party:	E.I. DU PONT DE NEMOURS CO	Substance:	GASOLINE
Case Type:	Aquifer affected		
Pilot Program:	No		
Staff Initials:	EAT	Case Number:	070066
Status:	Case Closed by Regional Board		
MTBE:	8	Lead Agency:	Regional

CORTESE:

Reg By:	LTNKA
Reg Id:	070066
Region:	CORTESE

Map ID Direction Distance Distance (ft.) Elevation	Site	Database(s)	EDR ID Number EPA ID Number
	BIG BREAK MARINA (Continued)		**S100353582**

Contra Costa SL:

Facility ID: 71327
Telephone: Not reported
Region: CNTRACSTA
Program Status:
UST: Inactive
HWG: Not reported
BUSP: Not reported

Facility ID: 70190
Telephone: (510) 757-5501
Region: CNTRACSTA
Program Status:
UST: Inactive
HWG: Not reported
BUSP: Not reported

Facility ID: 43195
Telephone: (510) 757-1210
Region: CNTRACSTA
Program Status:
UST: Active
HWG: Not reported
BUSP: Not reported

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17 WNW 1/2-1 4624 Higher	**ANTIOCH PAVING CO INC WILBUR AVE 2540 ANTIOCH, CA 94509**	**Ca. SL LUST Cortese**	**S102259981 N/A**

State LUST:

Facility Type	ACTIVE	Cross Street:	Not reported
Reg Board:	Central Valley Region	Qty Leaked:	Not reported
Chemical:	Hydrocarbons		
Lead Agency:	Regional Board		
Case Type:	Undefined		
Status:	Leak being confirmed		
Review Date:	12/19/1997	Confirm Leak:	08/25/1994
Workplan:	Not reported	Prelim Assess:	Not reported
Pollution Char:	Not reported	Remed Plan:	Not reported
Remed Action:	Not reported	Monitoring:	Not reported
Close Date:	Not reported	Release Date:	09/30/1994

LUST Region 5:

Respble Party:	ANTIOCH PAVING COMPANY	Substance:	HYDROCARBONS
Case Type:	Undefined		
Pilot Program:	No		
Staff Initials:	EAT	Case Number:	070075
Status:	Leak being confirmed		
MTBE:	Not reported	Lead Agency:	Regional

CORTESE:

Reg By: LTNKA
Reg Id: 070075
Region: CORTESE

ANTIOCH PAVING CO INC (Continued) **S102259981**

Contra Costa SL:
Facility ID: 38072
Telephone: (510) 757-0123
Region: CNTRACSTA
Program Status:
UST: Inactive
HWG: Not reported
BUSP: Active

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18 **OAKLEY ROAD METERING SITE** **Cal-Sites** **S101479973**
SW **OAKLEY RD. / PHILLIPS LN.** **N/A**
1/2-1 **ANTIOCH, CA 94509**
5217
Higher

CAL-SITES:
Facility ID 07490002
Status: REFRW
Status Date: 05/26/1994
Lead: Not reported
Region: 2 - BERKELEY
Branch: NC - NORTH COAST
File Name: Not reported
Status Name: PROPERTY/SITE REFERRED TO RWQCB
Lead Agancy: N/A
NPL: Not reported
SIC: 49 ELECTRIC, GAS & SANITARY SERVICES
Facility Type: Not reported
Facility Type Name: N/A
Staff Member Responsible for Site: Not reported
Supervisor Responsible for Site: Not reported
Region Water Control Board: SF - SAN FRANCISCO BAY
Access: Not reported
Cortese: Not reported
Hazardous Ranking Score: Not reported
Date Site Hazard Ranked: Not reported
Groundwater Contamination: Confirmed
No. of Contamintion Sources: 0
Lat/Long: Not reported
Lat/long Method: Not reported
State Assembly District Code: Not reported
State Senate District: Not reported
Activity: SITE SCREENING
Activity Status: PROPERTY/SITE REFERRED TO RWQCB
Background: Not reported
Alternative Name: AKLEY ROAD METERING SITE
Alternative Addr: OAKLEY RD. & PHILLIPS LN.
ANTIOCH, CA 94509
Alternative Name: TANDARD PACIFIC GAS LINE INC.
Alternative Addr: OAKLEY RD. & PHILLIPS LN.
ANTIOCH, CA 94509
Comment Date: 04/25/1980
Comment: QUESTIONNAIRE SENT
QUEST. RECEIVED. NO PROBLEM
TEL VERIFIED THEM AS A TRANSP.
The San Francisco Retional Water Quality Control Board
is directly overseeing site activities with help from
the County Environ. Health Svcs.

OAKLEY ROAD METERING SITE (Continued) S101479973

The Oakley Rd. metering Site occupies approx. .7 acre and is loated in Antioch, Contra Costa, California. It is currently used as a sotage area for PG&E natural gas pipeline equipment. The site is owned by the Standard Pacific Gas Lines, a California Corporation which is owned by both PG&E (87.5%) and Chevron corporation (12.5%). The site was used for routine gas condensate operations until the mid-1970's
In August 1991, soil and groundwater investigation was conducted to determine if petroleum hydrocarbons are present in soils and groundwater beneath the site. Contaminants detected in soil and their highest concentrations include the FF: benzene-1,100 ppb, toulene-5,400 ppb, ethylbenzene-35,000 ppb, xylene-150,000 ppb, TPH-5,500 ppm, and TPH-3,500 ppm. Contaminants in groundwater include: toulene - 2.3 ppb, ethylbenzene - 4.7 ppb, xylenes - 16 ppb, TPH - 4,400 ppb, TPH - 23,000 ppb. Floating products were observed in one of the monitoring wells and later analyzed to have pcb's in them. Nearby domestic wells were investigated and found to have non-detectable levels of the same contaminants detected beneath the site. Monitoring of these wells off-site under suvervision of the Contra Costa County Health Services Dept. is ongoing. The SF Regional Water Quality Control Board is currently reviewing a work plan for a follow-up site investigation to fully define the horiz. & vert. extent of the contam. plume.

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)	Facility ID
ANTIOCH	U001596204	ANTIOCH AIRPORT	RT 1 BOX 1186 LONETREE WAY	94509	UST	00000027881
ANTIOCH	U001596212	ARNOLD HOLUB	ROUTE 1 BOX 465	94509	UST	00000066033
ANTIOCH	U001596224	HEIDRON FARM	RT. 1 BOX 1110	94509	UST	00000022928
ANTIOCH	U001596227	INDUSTRIAL OIL COMPANY	RT 1 BOX 427	94509	UST	00000044914
ANTIOCH	U001596213	BRIDGEHEAD TRUCK STOP	RT-1 BOX 495	94509	UST	00000021675
ANTIOCH	S101580895	CHEVRON SS# 96946	BRIDGEHEAD RD	94509	Ca. FID, Ca. SL	07000982
ANTIOCH	U001596200	96946	BRIDGEHEAD ROAD	94509	UST	00000062935
ANTIOCH	1000252416	CALIFORNIA ORGANICS	445 A OLD HWY 4	94509	RCRIS-SQG, FINDS	
ANTIOCH	S100192743	ANTIOCH A B F	PASO CORTO ROAD, EAST OF SOMMERVILLE	94509	Cal-Sites	07490004
MIDDLETOWN	1000409170	GEOTHERMAL INDUSTRIES INC	BUTTS CANYON RD	94561	RCRIS-SQG, FINDS, CORRACTS, CERC-NFRAP, RCRIS-TSD	
OAKLEY	U001597812	J.J. LEWIS RANCH	RT. #1 RFD BOX 145 NEROLY RD.	94561	UST	00000044612
OAKLEY	U001597799	C.C.W.D. ANTIOCH OPERATIONS CT	RT. 1 BOX A130	94561	UST	00000044411
OAKLEY	U001597801	DAVID J. BLUMEN	RT. 1 BOX 151	94561	UST	00000047773
OAKLEY	U001597809	GUIDO LUCCHESI	RT. 1 BOX 298	94561	UST	00000041934
OAKLEY	U001597811	IRVINR & CAROLYN L. SHERMAN	RT. 1 BOX 292	94561	UST	00000022903
OAKLEY	U001597813	JACUZZI RANCH	RT. 1 BOX 134 NEROLEY	94561	UST	00000032972
OAKLEY	U001597823	ROY & RALPH LUCCHESI	RT 1 BOX 253	94561	UST	00000033502
OAKLEY	U001597826	STONEBARGER RANCH	RT 1 BOX 339	94561	UST	00000059862
OAKLEY	U001597829	VICTOR PATO	RT 1, BOX 173, EMPIRE AVE	94561	UST	00000028451
OAKLEY	U001597803	ELMER JOHNSON	RT 2 BOX 181	94561	UST	00000045232
OAKLEY	U001597806	EVO BALDOCCHI	RT. 2 BOX 187	94561	UST	00000008646
OAKLEY	U001597810	HOOVER E. KENNEDY	RT 2 BOX 118 BOLTON ROAD	94561	UST	00000021859
OAKLEY	U001597814	JOHN V. DEJESUS	RT. 2 BOX 183 SELLERS AVE	94561	UST	00000030076
OAKLEY	U001597830	WINDSWEPT LIVESTOCK CO	RT. 2 BOX 481A	94561	UST, Ca. SL	00000037064
OAKLEY	U001597827	TINO BACCHINI RANCH	RT. 2, BOX 179 SELLERS AVE.	94561	UST	00000048254
OAKLEY	S100849527	1X BRIDGEHEAD INC	5540 HWY 4	94561	HAZNET	CAC000837248
OAKLEY	S102261390	NGC-CESA #1	HWY 4/SUNSET AVE	94561	Ca. SL	07731
OAKLEY	S102261380	ARCO PRODUCTS	BRIDGEHEAD RD 5540	94561	Ca. SL	52684
OAKLEY	S101294138	BRIDGEHEAD INC	5540 BRIDGEHEAD RD	94561	LUST	070070
OAKLEY	S102261425	SHOSHONE OIL CORPORATION	OAKLEY GAS FIELD-HWY 4	94561	Ca. SL	07523
OAKLEY	S102261448	WESTERN CONT'L NGC-KYSH-1	SUNSET/HWY 4	94561	Ca. SL	07604
RURAL	U001596245	SHERMAN ISL. DEHYDRATOR-ODORAN	HIGHWAY 160	94509	UST	00000024885
TWITCHELL ISLAND	S101311746	TWITCHELL ISLAND	SAN JOAQUIN RIVER / THREEMILE SLOUGH	94509	Cal-Sites	34990002

GEOCHECK VERSION 2.1 ADDENDUM
FEDERAL DATABASE WELL INFORMATION

Well Closest to Target Property (Eastern Quadrant)

BASIC WELL DATA

Site ID:	375933121425001	Distance from TP:	>2 Miles
Site Type:	Single well, other than collector or Ranney type		
Year Constructed:	1978	County:	Contra Costa
Altitude:	33.00 ft.	State:	California
Well Depth:	152.00 ft.	Topographic Setting:	Valley flat
Depth to Water Table:	36.00 ft.	Prim. Use of Site:	Withdrawal of water
Date Measured:	01061978	Prim. Use of Water:	Domestic

LITHOLOGIC DATA

Not Reported

WATER LEVEL VARIABILITY

Not Reported

GEOCHECK VERSION 2.1
FEDERAL DATABASE WELL INFORMATION

Well Closest to Target Property (Southern Quadrant)

BASIC WELL DATA

Site ID:	380020121443901	Distance from TP:	1/8 - 1/4 Mile
Site Type:	Single well, other than collector or Ranney type		
Year Constructed:	1954	County:	Contra Costa
Altitude:	27.00 ft.	State:	California
Well Depth:	66.00 ft.	Topographic Setting:	Flat surface
Depth to Water Table:	13.71 ft.	Prim. Use of Site:	Withdrawal of water
Date Measured:	01251973	Prim. Use of Water:	Irrigation

LITHOLOGIC DATA

Geologic Age ID (Era/System/Series):	Cenozoic-Quaternary
Principal Lithology of Unit:	Not Reported
Further Description:	Not Reported

WATER LEVEL VARIABILITY

Water Level:	14.03 ft.	Water Level:	13.02 ft.	Water Level:	12.24 ft.	Water Level:	13.89 ft.
Date Measured:	01/25/73	Date Measured:	02/20/73	Date Measured:	03/21/73	Date Measured:	10/04/73
Water Level:	14.05 ft.	Water Level:	14.82 ft.	Water Level:	14.68 ft.	Water Level:	15.38 ft.
Date Measured:	03/11/74	Date Measured:	09/24/74	Date Measured:	04/07/75	Date Measured:	09/16/75
Water Level:	15.80 ft.	Water Level:	15.90 ft.	Water Level:	16.08 ft.	Water Level:	16.57 ft.
Date Measured:	04/12/76	Date Measured:	09/15/76	Date Measured:	04/26/77	Date Measured:	09/13/77
Water Level:	13.66 ft.	Water Level:	14.62 ft.	Water Level:	14.00 ft.	Water Level:	14.93 ft.
Date Measured:	04/17/78	Date Measured:	09/25/78	Date Measured:	04/17/79	Date Measured:	09/24/79
Water Level:	13.02 ft.	Water Level:	13.80 ft.	Water Level:	14.50 ft.	Water Level:	14.98 ft.
Date Measured:	04/10/80	Date Measured:	09/24/80	Date Measured:	04/21/81	Date Measured:	09/17/81
Water Level:	12.50 ft.	Water Level:	13.38 ft.				
Date Measured:	04/28/82	Date Measured:	09/24/82				

GEOCHECK VERSION 2.1
FEDERAL DATABASE WELL INFORMATION

Well Closest to Target Property (Western Quadrant)

BASIC WELL DATA

Site ID:	380016121454501	Distance from TP:	1/2 - 1 Mile
Site Type:	Single well, other than collector or Ranney type		
Year Constructed:	1962	County:	Contra Costa
Altitude:	50.00 ft.	State:	California
Well Depth:	140.00 ft.	Topographic Setting:	Hillside (slope)
Depth to Water Table:	50.00 ft.	Prim. Use of Site:	Withdrawal of water
Date Measured:	01011962	Prim. Use of Water:	Domestic

LITHOLOGIC DATA

Geologic Age ID (Era/System/Series):	Cenozoic-Quaternary
Principal Lithology of Unit:	Sand
Further Description:	Not Reported

WATER LEVEL VARIABILITY

Water Level:	22.80 ft.
Date Measured:	04/10/80

GEOCHECK VERSION 2.1
STATE DATABASE WELL INFORMATION

Water Wells:

Well Within >2 Miles of Target Property (Eastern Quadrant)

Water System Information:

Prime Station Code:	D07/007-TREATED	User ID:	ENG
FRDS Number Number:	0710007001	County:	Contra Costa
District Number:	04	Station Type:	STREAM/AMBNT/MUN/INTAKE
Water Type:	Surface Water	Well Status:	Abandoned
Source Lat/Long:	375946.2 1214205.0	Precision:	0.5 Mile (30 Seconds)
Source Name:	CONTRA COSTA CANAL-OAKLEY WTP-TRTD, ABND		
System Number:	0710007		
System Name:	DIABLO WATER DISTRICT		
Organization That Operates System:	PO BOX 127 OAKLEY, CA 94561		
Pop Served:	18000	Connections:	6236
Area Served:	OAKLEY		

Sample Information: *** Only Findings Above Detection Level Are Listed**

Sample Collected:	08/13/1986	Findings:	360.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	08/13/1986	Findings:	8.000
Chemical:	PH (LABORATORY)		
Sample Collected:	08/13/1986	Findings:	82.000 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	08/13/1986	Findings:	125.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	08/13/1986	Findings:	32.000 MG/L
Chemical:	CALCIUM		
Sample Collected:	08/13/1986	Findings:	11.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	08/13/1986	Findings:	27.000 MG/L
Chemical:	SODIUM		
Sample Collected:	08/13/1986	Findings:	1.500 MG/L
Chemical:	POTASSIUM		
Sample Collected:	08/13/1986	Findings:	43.000 MG/L
Chemical:	CHLORIDE		
Sample Collected:	08/13/1986	Findings:	199.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	08/06/1987	Findings:	2.000 UNITS
Chemical:	COLOR		
Sample Collected:	08/06/1987	Findings:	3.000 TON
Chemical:	ODOR THRESHOLD @ 60 C		
Sample Collected:	08/06/1987	Findings:	790.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	08/06/1987	Findings:	7.800
Chemical:	PH (LABORATORY)		
Sample Collected:	08/06/1987	Findings:	126.000 MG/L
Chemical:	BICARBONATE ALKALINITY		

Sample Collected: 08/06/1987 Findings: 157.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 08/06/1987 Findings: 35.000 MG/L
Chemical: CALCIUM

Sample Collected: 08/06/1987 Findings: 17.000 MG/L
Chemical: MAGNESIUM

Sample Collected: 08/06/1987 Findings: 78.000 MG/L
Chemical: SODIUM

Sample Collected: 08/06/1987 Findings: 3.200 MG/L
Chemical: POTASSIUM

Sample Collected: 08/06/1987 Findings: 130.000 MG/L
Chemical: CHLORIDE

Sample Collected: 08/06/1987 Findings: .130 MG/L
Chemical: FLUORIDE (TEMPERATURE DEPENDENT)

Sample Collected: 08/06/1987 Findings: 460.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 08/06/1987 Findings: .200 NTU
Chemical: TURBIDITY (LAB)

Sample Collected: 05/04/1989 Findings: 35.000 UG/L
Chemical: BROMODICHLORMETHANE (THM)

Sample Collected: 05/04/1989 Findings: 8.800 UG/L
Chemical: DIBROMOCHLOROMETHANE (THM)

Sample Collected: 05/04/1989 Findings: 92.000 UG/L
Chemical: CHLOROFORM (THM)

Sample Collected: 05/05/1989 Findings: 5.000 UNITS
Chemical: COLOR

Sample Collected: 05/05/1989 Findings: 4.000 TON
Chemical: ODOR THRESHOLD @ 60 C

Sample Collected: 05/05/1989 Findings: 340.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 05/05/1989 Findings: 7.300
Chemical: PH (LABORATORY)

Sample Collected: 05/05/1989 Findings: 82.000 MG/L
Chemical: BICARBONATE ALKALINITY

Sample Collected: 05/05/1989 Findings: 106.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 05/05/1989 Findings: 26.000 MG/L
Chemical: CALCIUM

Sample Collected: 05/05/1989 Findings: 10.000 MG/L
Chemical: MAGNESIUM

Sample Collected: 05/05/1989 Findings: 31.000 MG/L
Chemical: SODIUM

Sample Collected: 05/05/1989 Findings: .400 MG/L
Chemical: POTASSIUM

Sample Collected: 05/05/1989 Findings: 240.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 05/05/1989 Findings: .800 NTU
Chemical: TURBIDITY (LAB)

Sample Collected: 06/02/1992 Findings: 23.000 C
Chemical: SOURCE TEMPERATURE C

Sample Collected: 06/02/1992 Findings: 975.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 06/02/1992 Findings: 7.670
Chemical: FIELD PH

Sample Collected: 06/02/1992 Findings: 7.810
Chemical: PH (LABORATORY)

Sample Collected: 06/02/1992 Findings: 130.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 06/02/1992 Findings: 56.800 MG/L
Chemical: CALCIUM

Sample Collected: 06/02/1992 Findings: 30.000 MG/L
Chemical: MAGNESIUM

Sample Collected: 06/02/1992 Findings: 110.000 MG/L
Chemical: SODIUM

Sample Collected: 06/02/1992 Findings: 4.400 MG/L
Chemical: POTASSIUM

Sample Collected: 06/02/1992 Findings: 140.000 MG/L
Chemical: CHLORIDE

Sample Collected: 06/02/1992 Findings: .700 MG/L
Chemical: FLUORIDE (TEMPERATURE DEPENDENT)

Sample Collected: 06/02/1992 Findings: 600.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 06/02/1992 Findings: 7.580
Chemical: LANGELIER INDEX @ 60 C

Sample Collected: 06/02/1992 Findings: 3.800 MG/L
Chemical: NITRATE (AS NO3)

Sample Collected: 06/02/1992 Findings: .090
Chemical: AGGRSSIVE INDEX (CORROSIVITY)

Sample Collected: 09/13/1994 Findings: 7.160 UG/L
Chemical: BROMOFORM (THM)

Sample Collected: 09/13/1994 Findings: .570 UG/L
Chemical: DIBROMOCHLOROMETHANE (THM)

Sample Collected: 09/13/1994 Findings: 7.730 UG/L
Chemical: TOTAL TRIHALOMETHANES

Sample Collected: 10/04/1994 Findings: 8.650 UG/L
Chemical: BROMOFORM (THM)

Sample Collected: 10/04/1994 Findings: .630 UG/L
Chemical: DIBROMOCHLOROMETHANE (THM)

Sample Collected: 10/04/1994 Findings: 9.500 UG/L
Chemical: TOTAL TRIHALOMETHANES

Sample Collected: 11/01/1994 Findings: 8.200 UG/L
Chemical: BROMOFORM (THM)

Sample Collected: 11/01/1994 Findings: .600 UG/L
Chemical: DIBROMOCHLOROMETHANE (THM)

Sample Collected: 11/01/1994 Findings: 9.000 UG/L
Chemical: TOTAL TRIHALOMETHANES

Sample Collected: 12/06/1994 Findings: 4.340 UG/L
Chemical: BROMOFORM (THM)

Sample Collected: 12/06/1994 Findings: .800 UG/L
Chemical: DIBROMOCHLOROMETHANE (THM)

Sample Collected: 12/06/1994 Findings: 5.100 UG/L
Chemical: TOTAL TRIHALOMETHANES

Sample Collected: 01/10/1995 Findings: 3.900 UG/L
Chemical: BROMOFORM (THM)

Sample Collected: 01/10/1995 Findings: .700 UG/L
Chemical: DIBROMOCHLOROMETHANE (THM)

Sample Collected: 01/10/1995 Findings: 4.500 UG/L
Chemical: TOTAL TRIHALOMETHANES

Sample Collected: 04/11/1995 Findings: 3.900 UG/L
Chemical: BROMOFORM (THM)

Sample Collected: 04/11/1995 Findings: .900 UG/L
Chemical: DIBROMOCHLOROMETHANE (THM)

Sample Collected: 04/11/1995 Findings: 5.600 UG/L
Chemical: TOTAL TRIHALOMETHANES

Sample Collected: 08/08/1995 Findings: 3.600 UG/L
Chemical: BROMOFORM (THM)

Sample Collected: 08/08/1995 Findings: .600 UG/L
Chemical: DIBROMOCHLOROMETHANE (THM)

Sample Collected: 08/08/1995 Findings: 4.200 UG/L
Chemical: TOTAL TRIHALOMETHANES

Sample Collected: 10/10/1995 Findings: 5.500 UG/L
Chemical: BROMOFORM (THM)

Sample Collected: 10/10/1995 Findings: .580 UG/L
Chemical: DIBROMOCHLOROMETHANE (THM)

Sample Collected: 10/10/1995 Findings: 6.100 UG/L
Chemical: TOTAL TRIHALOMETHANES

Sample Collected: 07/16/1996 Findings: 11.300 UG/L
Chemical: BROMOFORM (THM)

Sample Collected: 07/16/1996 Findings: 1.400 UG/L
Chemical: DIBROMOCHLOROMETHANE (THM)

Sample Collected: 07/16/1996 Findings: 12.600 UG/L
Chemical: TOTAL TRIHALOMETHANES

Sample Collected: 08/06/1996 Findings: 3.400 UG/L
Chemical: BROMOFORM (THM)

Sample Collected: 08/06/1996 Findings: 3.900 UG/L
Chemical: TOTAL TRIHALOMETHANES

Sample Collected: 10/01/1996 Findings: 1.100 UG/L
Chemical: BROMOFORM (THM)

Sample Collected:	10/01/1996	Findings:	1.100 UG/L
Chemical:	TOTAL TRIHALOMETHANES		
Sample Collected:	07/15/1997	Findings:	4.800 UG/L
Chemical:	BROMOFORM (THM)		
Sample Collected:	07/15/1997	Findings:	.800 UG/L
Chemical:	DIBROMOCHLOROMETHANE (THM)		
Sample Collected:	07/15/1997	Findings:	5.600 UG/L
Chemical:	TOTAL TRIHALOMETHANES		
Sample Collected:	09/09/1997	Findings:	26.000 C
Chemical:	SOURCE TEMPERATURE C		
Sample Collected:	09/09/1997	Findings:	7.720
Chemical:	FIELD PH		
Sample Collected:	11/18/1997	Findings:	9.600 UG/L
Chemical:	BROMOFORM (THM)		
Sample Collected:	11/18/1997	Findings:	.700 UG/L
Chemical:	DIBROMOCHLOROMETHANE (THM)		
Sample Collected:	11/18/1997	Findings:	10.300 UG/L
Chemical:	TOTAL TRIHALOMETHANES		

Well Within 1 - 2 Miles of Target Property (Southern Quadrant)

Water System Information:

Prime Station Code:	D07/003-CANALRS	User ID:	ENG
FRDS Number Number:	0710010001	County:	Contra Costa
District Number:	04	Station Type:	STREAM/AMBNT/MUN/INTAKE
Water Type:	Surface Water	Well Status:	Active Raw
Source Lat/Long:	375857.0 1214410.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	CONTRA COSTA CANAL		
System Number:	0710010		
System Name:	RANDALL-BOLD WATER TREATMENT PLANT		
Organization That Operates System:	Not Reported CONCORD, CA 94524		
Pop Served:	Unknown, Small System	Connections:	1
Area Served:	Not Reported		

Sample Information: * Only Findings Above Detection Level Are Listed

Sample Collected:	05/04/1989	Findings:	8.000 UNITS
Chemical:	COLOR		
Sample Collected:	05/04/1989	Findings:	8.000 TON
Chemical:	ODOR THRESHOLD @ 60 C		
Sample Collected:	05/04/1989	Findings:	260.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	05/04/1989	Findings:	7.000
Chemical:	PH (LABORATORY)		
Sample Collected:	05/04/1989	Findings:	77.000 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	05/04/1989	Findings:	75.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		

Sample Collected: 05/04/1989 Findings: 14.000 MG/L
Chemical: CALCIUM

Sample Collected: 05/04/1989 Findings: 9.800 MG/L
Chemical: MAGNESIUM

Sample Collected: 05/04/1989 Findings: 29.000 MG/L
Chemical: SODIUM

Sample Collected: 05/04/1989 Findings: 1.400 MG/L
Chemical: POTASSIUM

Sample Collected: 05/04/1989 Findings: 28.000 MG/L
Chemical: CHLORIDE

Sample Collected: 05/04/1989 Findings: 160.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 05/04/1989 Findings: 10.000 NTU
Chemical: TURBIDITY (LAB)

Sample Collected: 09/13/1990 Findings: 520.000 PCI/L
Chemical: TRITIUM COUNTING ERROR

Sample Collected: 09/13/1990 Findings: 1.000 PCI/L
Chemical: STRONTIUM-90 COUNTING ERROR

Sample Collected: 09/13/1990 Findings: 1.000 PCI/L
Chemical: GROSS ALPHA COUNTING ERROR

Sample Collected: 09/13/1990 Findings: 5.000 PCI/L
Chemical: GROSS BETA

Sample Collected: 09/13/1990 Findings: 2.000 PCI/L
Chemical: GROSS BETA COUNTING ERROR

Sample Collected: 09/13/1990 Findings: 7.700 UG/L
Chemical: DICHLOROMETHANE

Sample Collected: 10/09/1990 Findings: 1.000 PCI/L
Chemical: GROSS ALPHA COUNTING ERROR

Sample Collected: 10/09/1990 Findings: 7.000 PCI/L
Chemical: GROSS BETA

Sample Collected: 10/09/1990 Findings: 3.000 PCI/L
Chemical: GROSS BETA COUNTING ERROR

Sample Collected: 04/01/1991 Findings: 40.000 UNITS
Chemical: COLOR

Sample Collected: 04/01/1991 Findings: 637.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 04/01/1991 Findings: 7.800
Chemical: PH (LABORATORY)

Sample Collected: 04/01/1991 Findings: 73.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 04/01/1991 Findings: 73.000 MG/L
Chemical: BICARBONATE ALKALINITY

Sample Collected: 04/01/1991 Findings: .200 UG/L
Chemical: PHOSPHATE

Sample Collected: 04/01/1991 Findings: 120.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

GEOCHECK VERSION 2.1
STATE DATABASE WELL INFORMATION

Sample Collected:	04/01/1991	Findings:	13.000 MG/L
Chemical:	CALCIUM		
Sample Collected:	04/01/1991	Findings:	17.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	04/01/1991	Findings:	77.000 MG/L
Chemical:	SODIUM		
Sample Collected:	04/01/1991	Findings:	4.200 MG/L
Chemical:	POTASSIUM		
Sample Collected:	04/01/1991	Findings:	120.000 MG/L
Chemical:	CHLORIDE		
Sample Collected:	04/01/1991	Findings:	24.000 MG/L
Chemical:	SILICA		
Sample Collected:	04/01/1991	Findings:	2.400 UG/L
Chemical:	ARSENIC		
Sample Collected:	04/01/1991	Findings:	.200 UG/L
Chemical:	BORON		
Sample Collected:	04/01/1991	Findings:	1300.000 UG/L
Chemical:	IRON		
Sample Collected:	04/01/1991	Findings:	52.000 UG/L
Chemical:	MANGANESE		
Sample Collected:	04/01/1991	Findings:	350.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	04/01/1991	Findings:	4.200 MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	10/07/1991	Findings:	10.000 UNITS
Chemical:	COLOR		
Sample Collected:	10/07/1991	Findings:	630.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	10/07/1991	Findings:	74.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	10/07/1991	Findings:	74.000 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	10/07/1991	Findings:	.200 UG/L
Chemical:	PHOSPHATE		
Sample Collected:	10/07/1991	Findings:	104.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	10/07/1991	Findings:	11.000 MG/L
Chemical:	CALCIUM		
Sample Collected:	10/07/1991	Findings:	16.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	10/07/1991	Findings:	78.000 MG/L
Chemical:	SODIUM		
Sample Collected:	10/07/1991	Findings:	3.800 MG/L
Chemical:	POTASSIUM		
Sample Collected:	10/07/1991	Findings:	120.000 MG/L
Chemical:	CHLORIDE		

Sample Collected: 10/07/1991 Findings: .200 MG/L
Chemical: FLUORIDE (TEMPERATURE DEPENDENT)

Sample Collected: 10/07/1991 Findings: 14.000 MG/L
Chemical: SILICA

Sample Collected: 10/07/1991 Findings: .200 UG/L
Chemical: BORON

Sample Collected: 10/07/1991 Findings: 360.000 UG/L
Chemical: IRON

Sample Collected: 10/07/1991 Findings: 30.800 UG/L
Chemical: MANGANESE

Sample Collected: 10/07/1991 Findings: 300.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 01/07/1992 Findings: 1.000 PCI/L
Chemical: GROSS ALPHA COUNTING ERROR

Sample Collected: 01/07/1992 Findings: 6.000 PCI/L
Chemical: GROSS BETA

Sample Collected: 01/07/1992 Findings: 1.000 PCI/L
Chemical: GROSS BETA COUNTING ERROR

Sample Collected: 01/07/1992 Findings: 1036.000 PCI/L
Chemical: TRITIUM

Sample Collected: 01/07/1992 Findings: 96.000 PCI/L
Chemical: TRITIUM COUNTING ERROR

Sample Collected: 01/07/1992 Findings: 1.000 PCI/L
Chemical: STRONTIUM-90 COUNTING ERROR

Sample Collected: 01/08/1992 Findings: 9.000 C
Chemical: SOURCE TEMPERATURE C

Sample Collected: 01/08/1992 Findings: 870.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 01/08/1992 Findings: 7.600
Chemical: FIELD PH

Sample Collected: 01/08/1992 Findings: 7.800
Chemical: PH (LABORATORY)

Sample Collected: 01/08/1992 Findings: 64.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 01/08/1992 Findings: 64.000 MG/L
Chemical: BICARBONATE ALKALINITY

Sample Collected: 01/08/1992 Findings: 1.000 MG/L
Chemical: CARBONATE ALKALINITY

Sample Collected: 01/08/1992 Findings: .200 MG/L
Chemical: AMMONIA (NH3-N)

Sample Collected: 01/08/1992 Findings: .200 UG/L
Chemical: PHOSPHATE

Sample Collected: 01/08/1992 Findings: 168.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 01/08/1992 Findings: 12.000 MG/L
Chemical: CALCIUM

Sample Collected: 01/08/1992 Findings: 20.000 MG/L
Chemical: MAGNESIUM

Sample Collected: 01/08/1992 Findings: 110.000 MG/L
Chemical: SODIUM

Sample Collected: 01/08/1992 Findings: 5.400 MG/L
Chemical: POTASSIUM

Sample Collected: 01/08/1992 Findings: 190.000 MG/L
Chemical: CHLORIDE

Sample Collected: 01/08/1992 Findings: 18.000 MG/L
Chemical: SILICA

Sample Collected: 01/08/1992 Findings: .200 UG/L
Chemical: BORON

Sample Collected: 01/08/1992 Findings: 250.000 UG/L
Chemical: IRON

Sample Collected: 01/08/1992 Findings: 12.800 UG/L
Chemical: MANGANESE

Sample Collected: 01/08/1992 Findings: 450.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 01/08/1992 Findings: 1.000 MG/L
Chemical: HYDROXIDE ALKALINITY

Sample Collected: 01/08/1992 Findings: 3.400 MG/L
Chemical: NITRATE (AS NO3)

Sample Collected: 01/08/1992 Findings: 6.000 PCI/L
Chemical: GROSS BETA

Sample Collected: 01/08/1992 Findings: 1036.000 PCI/L
Chemical: TRITIUM

Sample Collected: 04/06/1992 Findings: 40.000 UNITS
Chemical: COLOR

Sample Collected: 04/06/1992 Findings: 360.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 04/06/1992 Findings: 8.100
Chemical: PH (LABORATORY)

Sample Collected: 04/06/1992 Findings: 76.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 04/06/1992 Findings: 76.000 MG/L
Chemical: BICARBONATE ALKALINITY

Sample Collected: 04/06/1992 Findings: .300 UG/L
Chemical: PHOSPHATE

Sample Collected: 04/06/1992 Findings: 90.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 04/06/1992 Findings: 11.000 MG/L
Chemical: CALCIUM

Sample Collected: 04/06/1992 Findings: 12.000 MG/L
Chemical: MAGNESIUM

Sample Collected: 04/06/1992 Findings: 35.000 MG/L
Chemical: SODIUM

GEOCHECK VERSION 2.1
STATE DATABASE WELL INFORMATION

Sample Collected: 04/06/1992 Findings: 2.200 MG/L
Chemical: POTASSIUM

Sample Collected: 04/06/1992 Findings: 39.000 MG/L
Chemical: CHLORIDE

Sample Collected: 04/06/1992 Findings: 15.000 MG/L
Chemical: SILICA

Sample Collected: 04/06/1992 Findings: 420.000 UG/L
Chemical: IRON

Sample Collected: 04/06/1992 Findings: 27.000 UG/L
Chemical: MANGANESE

Sample Collected: 04/06/1992 Findings: 190.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 07/13/1992 Findings: 24.400 C
Chemical: SOURCE TEMPERATURE C

Sample Collected: 07/13/1992 Findings: 20.000 UNITS
Chemical: COLOR

Sample Collected: 07/13/1992 Findings: 830.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 07/13/1992 Findings: 7.600
Chemical: FIELD PH

Sample Collected: 07/13/1992 Findings: 7.800
Chemical: PH (LABORATORY)

Sample Collected: 07/13/1992 Findings: 66.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 07/13/1992 Findings: 66.000 MG/L
Chemical: BICARBONATE ALKALINITY

Sample Collected: 07/13/1992 Findings: .200 UG/L
Chemical: PHOSPHATE

Sample Collected: 07/13/1992 Findings: 120.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 07/13/1992 Findings: 16.000 MG/L
Chemical: CALCIUM

Sample Collected: 07/13/1992 Findings: 19.000 MG/L
Chemical: MAGNESIUM

Sample Collected: 07/13/1992 Findings: 110.000 MG/L
Chemical: SODIUM

Sample Collected: 07/13/1992 Findings: 5.200 MG/L
Chemical: POTASSIUM

Sample Collected: 07/13/1992 Findings: 180.000 MG/L
Chemical: CHLORIDE

Sample Collected: 07/13/1992 Findings: 12.000 MG/L
Chemical: SILICA

Sample Collected: 07/13/1992 Findings: .100 UG/L
Chemical: BORON

Sample Collected: 07/13/1992 Findings: 240.000 UG/L
Chemical: IRON

GEOCHECK VERSION 2.1
STATE DATABASE WELL INFORMATION

Sample Collected: 07/13/1992 Findings: 23.100 UG/L
Chemical: MANGANESE

Sample Collected: 07/13/1992 Findings: 410.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 07/13/1992 Findings: .600 MG/L
Chemical: BROMIDE

Sample Collected: 10/05/1992 Findings: 21.200 C
Chemical: SOURCE TEMPERATURE C

Sample Collected: 10/05/1992 Findings: 10.000 UNITS
Chemical: COLOR

Sample Collected: 10/05/1992 Findings: 850.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 10/05/1992 Findings: 7.700
Chemical: FIELD PH

Sample Collected: 10/05/1992 Findings: 7.900
Chemical: PH (LABORATORY)

Sample Collected: 10/05/1992 Findings: 73.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 10/05/1992 Findings: 73.000 MG/L
Chemical: BICARBONATE ALKALINITY

Sample Collected: 10/05/1992 Findings: .230 UG/L
Chemical: PHOSPHATE

Sample Collected: 10/05/1992 Findings: 122.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 10/05/1992 Findings: 9.700 MG/L
Chemical: CALCIUM

Sample Collected: 10/05/1992 Findings: 21.000 MG/L
Chemical: MAGNESIUM

Sample Collected: 10/05/1992 Findings: 120.000 MG/L
Chemical: SODIUM

Sample Collected: 10/05/1992 Findings: 5.500 MG/L
Chemical: POTASSIUM

Sample Collected: 10/05/1992 Findings: 180.000 MG/L
Chemical: CHLORIDE

Sample Collected: 10/05/1992 Findings: 13.000 MG/L
Chemical: SILICA

Sample Collected: 10/05/1992 Findings: .100 UG/L
Chemical: BORON

Sample Collected: 10/05/1992 Findings: 150.000 UG/L
Chemical: IRON

Sample Collected: 10/05/1992 Findings: 32.000 UG/L
Chemical: MANGANESE

Sample Collected: 10/05/1992 Findings: 3600.000 UG/L
Chemical: ALUMINUM

Sample Collected: 10/05/1992 Findings: 420.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 12/01/1992 Findings: 77.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 12/01/1992 Findings: .220 UG/L
Chemical: PHOSPHATE

Sample Collected: 12/01/1992 Findings: 134.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 12/01/1992 Findings: 14.000 MG/L
Chemical: CALCIUM

Sample Collected: 12/01/1992 Findings: 22.000 MG/L
Chemical: MAGNESIUM

Sample Collected: 12/01/1992 Findings: 120.000 MG/L
Chemical: SODIUM

Sample Collected: 12/01/1992 Findings: 5.500 MG/L
Chemical: POTASSIUM

Sample Collected: 12/01/1992 Findings: 190.000 MG/L
Chemical: CHLORIDE

Sample Collected: 12/01/1992 Findings: .470 MG/L
Chemical: FLUORIDE (TEMPERATURE DEPENDENT)

Sample Collected: 12/01/1992 Findings: 14.000 MG/L
Chemical: SILICA

Sample Collected: 12/01/1992 Findings: 450.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 12/01/1992 Findings: 2.300 MG/L
Chemical: NITRATE (AS NO3)

Sample Collected: 12/01/1992 Findings: .720 MG/L
Chemical: BROMIDE

Sample Collected: 01/04/1993 Findings: 20.500 C
Chemical: SOURCE TEMPERATURE C

Sample Collected: 01/04/1993 Findings: 40.000 UNITS
Chemical: COLOR

Sample Collected: 01/04/1993 Findings: 600.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 01/04/1993 Findings: 7.800
Chemical: FIELD PH

Sample Collected: 01/04/1993 Findings: 7.800
Chemical: PH (LABORATORY)

Sample Collected: 01/04/1993 Findings: 70.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 01/04/1993 Findings: 70.000 MG/L
Chemical: BICARBONATE ALKALINITY

Sample Collected: 01/04/1993 Findings: .300 UG/L
Chemical: PHOSPHATE

Sample Collected: 01/04/1993 Findings: 106.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 01/04/1993 Findings: 10.000 MG/L
Chemical: CALCIUM

GEOCHECK VERSION 2.1
STATE DATABASE WELL INFORMATION

Sample Collected:	10/05/1992	Findings:	7.200 NTU
Chemical:	FIELD TURBIDITY		
Sample Collected:	10/05/1992	Findings:	.630 MG/L
Chemical:	BROMIDE		
Sample Collected:	10/05/1992	Findings:	.028 UG/L
Chemical:	FOAMING AGENTS (MBAS)		
Sample Collected:	11/03/1992	Findings:	23.900 C
Chemical:	SOURCE TEMPERATURE C		
Sample Collected:	11/03/1992	Findings:	950.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	11/03/1992	Findings:	8.000
Chemical:	FIELD PH		
Sample Collected:	11/03/1992	Findings:	8.000
Chemical:	PH (LABORATORY)		
Sample Collected:	11/03/1992	Findings:	73.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	11/03/1992	Findings:	.200 UG/L
Chemical:	PHOSPHATE		
Sample Collected:	11/03/1992	Findings:	126.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	11/03/1992	Findings:	13.000 MG/L
Chemical:	CALCIUM		
Sample Collected:	11/03/1992	Findings:	22.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	11/03/1992	Findings:	110.000 MG/L
Chemical:	SODIUM		
Sample Collected:	11/03/1992	Findings:	5.300 MG/L
Chemical:	POTASSIUM		
Sample Collected:	11/03/1992	Findings:	190.000 MG/L
Chemical:	CHLORIDE		
Sample Collected:	11/03/1992	Findings:	.490 MG/L
Chemical:	FLUORIDE (TEMPERATURE DEPENDENT)		
Sample Collected:	11/03/1992	Findings:	13.000 MG/L
Chemical:	SILICA		
Sample Collected:	11/03/1992	Findings:	440.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	11/03/1992	Findings:	.690 MG/L
Chemical:	BROMIDE		
Sample Collected:	12/01/1992	Findings:	22.600 C
Chemical:	SOURCE TEMPERATURE C		
Sample Collected:	12/01/1992	Findings:	950.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	12/01/1992	Findings:	8.100
Chemical:	FIELD PH		
Sample Collected:	12/01/1992	Findings:	8.100
Chemical:	PH (LABORATORY)		

Sample Collected: 01/04/1993 Findings: 16.000 MG/L
Chemical: MAGNESIUM

Sample Collected: 01/04/1993 Findings: 63.000 MG/L
Chemical: SODIUM

Sample Collected: 01/04/1993 Findings: 3.600 MG/L
Chemical: POTASSIUM

Sample Collected: 01/04/1993 Findings: 90.000 MG/L
Chemical: CHLORIDE

Sample Collected: 01/04/1993 Findings: 18.000 MG/L
Chemical: SILICA

Sample Collected: 01/04/1993 Findings: 339.000 UG/L
Chemical: IRON

Sample Collected: 01/04/1993 Findings: 270.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 01/04/1993 Findings: 8.600
Chemical: LANGELIER INDEX @ 60 C

Sample Collected: 01/04/1993 Findings: 3.900 MG/L
Chemical: NITRATE (AS NO3)

Sample Collected: 01/04/1993 Findings: 548.000 NTU
Chemical: FIELD TURBIDITY

Sample Collected: 01/04/1993 Findings: .250 MG/L
Chemical: BROMIDE

Sample Collected: 01/04/1993 Findings: .050 UG/L
Chemical: FOAMING AGENTS (MBAS)

Sample Collected: 02/01/1993 Findings: 880.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 02/01/1993 Findings: 7.357
Chemical: PH (LABORATORY)

Sample Collected: 02/01/1993 Findings: 79.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 02/01/1993 Findings: 164.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 02/01/1993 Findings: 24.000 MG/L
Chemical: CALCIUM

Sample Collected: 02/01/1993 Findings: 25.000 MG/L
Chemical: MAGNESIUM

Sample Collected: 02/01/1993 Findings: 82.000 MG/L
Chemical: SODIUM

Sample Collected: 02/01/1993 Findings: 5.400 MG/L
Chemical: POTASSIUM

Sample Collected: 02/01/1993 Findings: 96.831 MG/L
Chemical: CHLORIDE

Sample Collected: 02/01/1993 Findings: .411 MG/L
Chemical: FLUORIDE (TEMPERATURE DEPENDENT)

Sample Collected: 02/01/1993 Findings: 11.650 MG/L
Chemical: NITRATE (AS NO3)

GEOCHECK VERSION 2.1
STATE DATABASE WELL INFORMATION

Sample Collected:	03/01/1993	Findings:	730.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	03/01/1993	Findings:	7.650
Chemical:	PH (LABORATORY)		
Sample Collected:	03/01/1993	Findings:	94.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	03/01/1993	Findings:	.280 UG/L
Chemical:	PHOSPHATE		
Sample Collected:	03/01/1993	Findings:	174.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	03/01/1993	Findings:	23.000 MG/L
Chemical:	CALCIUM		
Sample Collected:	03/01/1993	Findings:	24.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	03/01/1993	Findings:	89.000 MG/L
Chemical:	SODIUM		
Sample Collected:	03/01/1993	Findings:	3.200 MG/L
Chemical:	POTASSIUM		
Sample Collected:	03/01/1993	Findings:	100.000 MG/L
Chemical:	CHLORIDE		
Sample Collected:	03/01/1993	Findings:	.540 MG/L
Chemical:	FLUORIDE (TEMPERATURE DEPENDENT)		
Sample Collected:	03/01/1993	Findings:	20.000 MG/L
Chemical:	SILICA		
Sample Collected:	03/01/1993	Findings:	7.800 MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	04/05/1993	Findings:	17.000 C
Chemical:	SOURCE TEMPERATURE C		
Sample Collected:	04/05/1993	Findings:	30.000 UNITS
Chemical:	COLOR		
Sample Collected:	04/05/1993	Findings:	740.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	04/05/1993	Findings:	8.250
Chemical:	PH (LABORATORY)		
Sample Collected:	04/05/1993	Findings:	94.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	04/05/1993	Findings:	94.000 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	04/05/1993	Findings:	180.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	04/05/1993	Findings:	27.000 MG/L
Chemical:	CALCIUM		
Sample Collected:	04/05/1993	Findings:	30.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	04/05/1993	Findings:	80.000 MG/L
Chemical:	SODIUM		

Sample Collected: 04/05/1993 Findings: 2.500 MG/L
Chemical: POTASSIUM

Sample Collected: 04/05/1993 Findings: 97.000 MG/L
Chemical: CHLORIDE

Sample Collected: 04/05/1993 Findings: 14.000 MG/L
Chemical: SILICA

Sample Collected: 04/05/1993 Findings: 470.000 UG/L
Chemical: IRON

Sample Collected: 04/05/1993 Findings: 46.000 UG/L
Chemical: MANGANESE

Sample Collected: 04/05/1993 Findings: 410.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 04/05/1993 Findings: 8.110
Chemical: LANGELIER INDEX @ 60 C

Sample Collected: 04/05/1993 Findings: 4.400 MG/L
Chemical: NITRATE (AS NO3)

Sample Collected: 04/05/1993 Findings: 3.000 PCI/L
Chemical: GROSS ALPHA

Sample Collected: 04/05/1993 Findings: 7.000 PCI/L
Chemical: GROSS BETA

Sample Collected: 04/05/1993 Findings: 327.000 PCI/L
Chemical: TRITIUM

Sample Collected: 05/04/1993 Findings: 355.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 05/04/1993 Findings: 8.100
Chemical: PH (LABORATORY)

Sample Collected: 05/04/1993 Findings: 67.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 05/04/1993 Findings: 88.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 05/04/1993 Findings: 12.000 MG/L
Chemical: CALCIUM

Sample Collected: 05/04/1993 Findings: 10.000 MG/L
Chemical: MAGNESIUM

Sample Collected: 05/04/1993 Findings: 31.000 MG/L
Chemical: SODIUM

Sample Collected: 05/04/1993 Findings: 1.800 MG/L
Chemical: POTASSIUM

Sample Collected: 05/04/1993 Findings: 29.000 MG/L
Chemical: CHLORIDE

Sample Collected: 05/04/1993 Findings: .300 MG/L
Chemical: FLUORIDE (TEMPERATURE DEPENDENT)

Sample Collected: 05/04/1993 Findings: 13.000 MG/L
Chemical: SILICA

Sample Collected: 06/01/1993 Findings: 255.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 06/01/1993 Findings: 7.500
Chemical: PH (LABORATORY)

Sample Collected: 06/01/1993 Findings: 60.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 06/01/1993 Findings: 68.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 06/01/1993 Findings: 12.000 MG/L
Chemical: CALCIUM

Sample Collected: 06/01/1993 Findings: 15.000 MG/L
Chemical: MAGNESIUM

Sample Collected: 06/01/1993 Findings: 22.000 MG/L
Chemical: SODIUM

Sample Collected: 06/01/1993 Findings: 1.500 MG/L
Chemical: POTASSIUM

Sample Collected: 06/01/1993 Findings: 24.000 MG/L
Chemical: CHLORIDE

Sample Collected: 06/01/1993 Findings: 6.000 MG/L
Chemical: SILICA

Sample Collected: 06/01/1993 Findings: 130.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 07/19/1993 Findings: 24.200 C
Chemical: SOURCE TEMPERATURE C

Sample Collected: 07/19/1993 Findings: 5.000 UNITS
Chemical: COLOR

Sample Collected: 07/19/1993 Findings: 160.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 07/19/1993 Findings: 7.520
Chemical: FIELD PH

Sample Collected: 07/19/1993 Findings: 7.600
Chemical: PH (LABORATORY)

Sample Collected: 07/19/1993 Findings: 48.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 07/19/1993 Findings: 48.000 MG/L
Chemical: BICARBONATE ALKALINITY

Sample Collected: 07/19/1993 Findings: 48.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 07/19/1993 Findings: 7.900 MG/L
Chemical: CALCIUM

Sample Collected: 07/19/1993 Findings: 6.000 MG/L
Chemical: MAGNESIUM

Sample Collected: 07/19/1993 Findings: 11.000 MG/L
Chemical: SODIUM

Sample Collected: 07/19/1993 Findings: 1.200 MG/L
Chemical: POTASSIUM

Sample Collected: 07/19/1993 Findings: 17.000 MG/L
Chemical: CHLORIDE

Sample Collected: 07/19/1993 Findings: 2.400 UG/L
Chemical: ARSENIC

Sample Collected: 07/19/1993 Findings: 420.000 UG/L
Chemical: IRON

Sample Collected: 07/19/1993 Findings: 41.000 UG/L
Chemical: MANGANESE

Sample Collected: 07/19/1993 Findings: 80.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 07/19/1993 Findings: 8.750
Chemical: LANGELIER INDEX @ 60 C

Sample Collected: 08/02/1993 Findings: 160.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 08/02/1993 Findings: 7.620
Chemical: PH (LABORATORY)

Sample Collected: 08/02/1993 Findings: 45.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 08/02/1993 Findings: 44.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 08/02/1993 Findings: 5.500 MG/L
Chemical: CALCIUM

Sample Collected: 08/02/1993 Findings: 6.100 MG/L
Chemical: MAGNESIUM

Sample Collected: 08/02/1993 Findings: 15.000 MG/L
Chemical: SODIUM

Sample Collected: 08/02/1993 Findings: 1.500 MG/L
Chemical: POTASSIUM

Sample Collected: 08/02/1993 Findings: 18.000 MG/L
Chemical: CHLORIDE

Sample Collected: 08/02/1993 Findings: 8.600 MG/L
Chemical: SILICA

Sample Collected: 08/02/1993 Findings: 80.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 09/14/1993 Findings: 20.800 C
Chemical: SOURCE TEMPERATURE C

Sample Collected: 09/14/1993 Findings: 220.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 09/14/1993 Findings: 7.080
Chemical: FIELD PH

Sample Collected: 09/14/1993 Findings: 7.600
Chemical: PH (LABORATORY)

Sample Collected: 09/14/1993 Findings: 58.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 09/14/1993 Findings: 54.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 09/14/1993 Findings: 7.700 MG/L
Chemical: CALCIUM

Sample Collected: 09/14/1993 Findings: 7.700 MG/L
Chemical: MAGNESIUM

Sample Collected: 09/14/1993 Findings: 22.000 MG/L
Chemical: SODIUM

Sample Collected: 09/14/1993 Findings: 1.500 MG/L
Chemical: POTASSIUM

Sample Collected: 09/14/1993 Findings: 24.000 MG/L
Chemical: CHLORIDE

Sample Collected: 09/14/1993 Findings: 19.000 MG/L
Chemical: SILICA

Sample Collected: 09/14/1993 Findings: 110.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 10/04/1993 Findings: 20.000 C
Chemical: SOURCE TEMPERATURE C

Sample Collected: 10/04/1993 Findings: 5.000 UNITS
Chemical: COLOR

Sample Collected: 10/04/1993 Findings: 330.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 10/04/1993 Findings: 7.570
Chemical: FIELD PH

Sample Collected: 10/04/1993 Findings: 7.800
Chemical: PH (LABORATORY)

Sample Collected: 10/04/1993 Findings: 68.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 10/04/1993 Findings: 68.000 MG/L
Chemical: BICARBONATE ALKALINITY

Sample Collected: 10/04/1993 Findings: 80.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 10/04/1993 Findings: 8.600 MG/L
Chemical: CALCIUM

Sample Collected: 10/04/1993 Findings: 10.000 MG/L
Chemical: MAGNESIUM

Sample Collected: 10/04/1993 Findings: 36.000 MG/L
Chemical: SODIUM

Sample Collected: 10/04/1993 Findings: 1.800 MG/L
Chemical: POTASSIUM

Sample Collected: 10/04/1993 Findings: 48.000 MG/L
Chemical: CHLORIDE

Sample Collected: 10/04/1993 Findings: 18.000 MG/L
Chemical: SILICA

Sample Collected: 10/04/1993 Findings: 2.300 UG/L
Chemical: ARSENIC

Sample Collected: 10/04/1993 Findings: 140.000 UG/L
Chemical: IRON

Sample Collected: 10/04/1993 Findings: 33.000 UG/L
Chemical: MANGANESE

Sample Collected: 10/04/1993 Findings: 170.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 10/04/1993 Findings: 8.650
Chemical: LANGELIER INDEX @ 60 C

Sample Collected: 10/04/1993 Findings: 4.600 NTU
Chemical: FIELD TURBIDITY

Sample Collected: 11/01/1993 Findings: 420.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 11/01/1993 Findings: 7.800
Chemical: PH (LABORATORY)

Sample Collected: 11/01/1993 Findings: 59.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 11/01/1993 Findings: 78.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 11/01/1993 Findings: 8.300 MG/L
Chemical: CALCIUM

Sample Collected: 11/01/1993 Findings: 11.000 MG/L
Chemical: MAGNESIUM

Sample Collected: 11/01/1993 Findings: 51.000 MG/L
Chemical: SODIUM

Sample Collected: 11/01/1993 Findings: 2.600 MG/L
Chemical: POTASSIUM

Sample Collected: 11/01/1993 Findings: 79.000 MG/L
Chemical: CHLORIDE

Sample Collected: 11/01/1993 Findings: 16.000 MG/L
Chemical: SILICA

Sample Collected: 11/01/1993 Findings: 220.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 12/06/1993 Findings: 490.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 12/06/1993 Findings: 7.800
Chemical: FIELD PH

Sample Collected: 12/06/1993 Findings: 8.000
Chemical: PH (LABORATORY)

Sample Collected: 12/06/1993 Findings: 60.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 12/06/1993 Findings: 88.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 12/06/1993 Findings: 11.000 MG/L
Chemical: CALCIUM

Sample Collected: 12/06/1993 Findings: 13.000 MG/L
Chemical: MAGNESIUM

Sample Collected: 12/06/1993 Findings: 65.000 MG/L
Chemical: SODIUM

Sample Collected: 12/06/1993 Findings: 3.200 MG/L
Chemical: POTASSIUM

Sample Collected: 12/06/1993 Findings: 97.000 MG/L
Chemical: CHLORIDE

Sample Collected: 12/06/1993 Findings: 16.000 MG/L
Chemical: SILICA

Sample Collected: 12/06/1993 Findings: 250.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 12/06/1993 Findings: .500 MG/L
Chemical: BROMIDE

Sample Collected: 01/03/1994 Findings: 10.500 C
Chemical: SOURCE TEMPERATURE C

Sample Collected: 01/03/1994 Findings: 15.000 UNITS
Chemical: COLOR

Sample Collected: 01/03/1994 Findings: 410.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 01/03/1994 Findings: 7.560
Chemical: FIELD PH

Sample Collected: 01/03/1994 Findings: 7.800
Chemical: PH (LABORATORY)

Sample Collected: 01/03/1994 Findings: 68.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 01/03/1994 Findings: 68.000 MG/L
Chemical: BICARBONATE ALKALINITY

Sample Collected: 01/03/1994 Findings: .100 MG/L
Chemical: AMMONIA (NH3-N)

Sample Collected: 01/03/1994 Findings: .220 UG/L
Chemical: PHOSPHATE

Sample Collected: 01/03/1994 Findings: 84.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 01/03/1994 Findings: 10.000 MG/L
Chemical: CALCIUM

Sample Collected: 01/03/1994 Findings: 11.000 MG/L
Chemical: MAGNESIUM

Sample Collected: 01/03/1994 Findings: 47.000 MG/L
Chemical: SODIUM

Sample Collected: 01/03/1994 Findings: 2.900 MG/L
Chemical: POTASSIUM

Sample Collected: 01/03/1994 Findings: 69.000 MG/L
Chemical: CHLORIDE

Sample Collected: 01/03/1994 Findings: 18.000 MG/L
Chemical: SILICA

Sample Collected: 01/03/1994 Findings: 2.300 UG/L
Chemical: ARSENIC

Sample Collected: 01/03/1994 Findings: 100.000 UG/L
Chemical: BORON

Sample Collected: 01/03/1994 Findings: 210.000 UG/L
Chemical: IRON

Sample Collected: 01/03/1994 Findings: 18.000 UG/L
Chemical: MANGANESE

Sample Collected: 01/03/1994 Findings: 210.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 01/03/1994 Findings: 8.740
Chemical: LANGELIER INDEX @ 60 C

Sample Collected: 01/03/1994 Findings: 2.100 MG/L
Chemical: NITRATE (AS NO3)

Sample Collected: 01/03/1994 Findings: 3.500 NTU
Chemical: FIELD TURBIDITY

Sample Collected: 01/03/1994 Findings: .170 MG/L
Chemical: BROMIDE

Sample Collected: 02/07/1994 Findings: 12.200 C
Chemical: SOURCE TEMPERATURE C

Sample Collected: 02/07/1994 Findings: 350.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 02/07/1994 Findings: 7.600
Chemical: FIELD PH

Sample Collected: 02/07/1994 Findings: 7.400
Chemical: PH (LABORATORY)

Sample Collected: 02/07/1994 Findings: 68.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 02/07/1994 Findings: 88.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 02/07/1994 Findings: 12.000 MG/L
Chemical: CALCIUM

Sample Collected: 02/07/1994 Findings: 11.000 MG/L
Chemical: MAGNESIUM

Sample Collected: 02/07/1994 Findings: 34.000 MG/L
Chemical: SODIUM

Sample Collected: 02/07/1994 Findings: 2.500 MG/L
Chemical: POTASSIUM

Sample Collected: 02/07/1994 Findings: 52.000 MG/L
Chemical: CHLORIDE

Sample Collected: 02/07/1994 Findings: 18.000 MG/L
Chemical: SILICA

Sample Collected: 02/07/1994 Findings: 190.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 02/07/1994 Findings: 2.400 MG/L
Chemical: NITRATE (AS NO3)

Sample Collected: 02/07/1994 Findings: .180 MG/L
Chemical: BROMIDE

Sample Collected: 03/07/1994 Findings: 17.100 C
Chemical: SOURCE TEMPERATURE C

Sample Collected: 03/07/1994 Findings: 370.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 03/07/1994 Findings: 7.730
Chemical: FIELD PH

Sample Collected: 03/07/1994 Findings: 7.700
Chemical: PH (LABORATORY)

Sample Collected: 03/07/1994 Findings: 73.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 03/07/1994 Findings: 98.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 03/07/1994 Findings: 12.000 MG/L
Chemical: CALCIUM

Sample Collected: 03/07/1994 Findings: 12.000 MG/L
Chemical: MAGNESIUM

Sample Collected: 03/07/1994 Findings: 33.000 MG/L
Chemical: SODIUM

Sample Collected: 03/07/1994 Findings: 2.400 MG/L
Chemical: POTASSIUM

Sample Collected: 03/07/1994 Findings: 45.000 MG/L
Chemical: CHLORIDE

Sample Collected: 03/07/1994 Findings: .200 MG/L
Chemical: FLUORIDE (TEMPERATURE DEPENDENT)

Sample Collected: 03/07/1994 Findings: 18.400 MG/L
Chemical: SILICA

Sample Collected: 03/07/1994 Findings: 190.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 03/07/1994 Findings: 3.200 MG/L
Chemical: NITRATE (AS NO3)

Sample Collected: 03/07/1994 Findings: 4.600 NTU
Chemical: FIELD TURBIDITY

Sample Collected: 03/07/1994 Findings: .100 MG/L
Chemical: BROMIDE

Sample Collected: 04/04/1994 Findings: 17.000 C
Chemical: SOURCE TEMPERATURE C

Sample Collected: 04/04/1994 Findings: 30.000 UNITS
Chemical: COLOR

Sample Collected: 04/04/1994 Findings: 510.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 04/04/1994 Findings: 8.060
Chemical: FIELD PH

Sample Collected: 04/04/1994 Findings: 8.000
Chemical: PH (LABORATORY)

Sample Collected: 04/04/1994 Findings: 95.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 04/04/1994 Findings: 95.000 MG/L
Chemical: BICARBONATE ALKALINITY

Sample Collected: 04/04/1994 Findings: .260 UG/L
Chemical: PHOSPHATE

Sample Collected:	04/04/1994	Findings:	136.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	04/04/1994	Findings:	18.000 MG/L
Chemical:	CALCIUM		
Sample Collected:	04/04/1994	Findings:	17.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	04/04/1994	Findings:	51.000 MG/L
Chemical:	SODIUM		
Sample Collected:	04/04/1994	Findings:	2.900 MG/L
Chemical:	POTASSIUM		
Sample Collected:	04/04/1994	Findings:	64.000 MG/L
Chemical:	CHLORIDE		
Sample Collected:	04/04/1994	Findings:	17.000 MG/L
Chemical:	SILICA		
Sample Collected:	04/04/1994	Findings:	2.200 UG/L
Chemical:	ARSENIC		
Sample Collected:	04/04/1994	Findings:	110.000 UG/L
Chemical:	BORON		
Sample Collected:	04/04/1994	Findings:	360.000 UG/L
Chemical:	IRON		
Sample Collected:	04/04/1994	Findings:	36.000 UG/L
Chemical:	MANGANESE		
Sample Collected:	04/04/1994	Findings:	270.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	04/04/1994	Findings:	8.260
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	04/04/1994	Findings:	2.600 MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	04/04/1994	Findings:	4.500 NTU
Chemical:	FIELD TURBIDITY		
Sample Collected:	04/04/1994	Findings:	.170 MG/L
Chemical:	BROMIDE		
Sample Collected:	04/04/1994	Findings:	6.200 UG/L
Chemical:	DI(2-ETHYLHEXYL)PHTHALATE		
Sample Collected:	05/02/1994	Findings:	370.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	05/02/1994	Findings:	8.300
Chemical:	PH (LABORATORY)		
Sample Collected:	05/02/1994	Findings:	81.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	05/02/1994	Findings:	96.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	05/02/1994	Findings:	14.000 MG/L
Chemical:	CALCIUM		
Sample Collected:	05/02/1994	Findings:	13.000 MG/L
Chemical:	MAGNESIUM		

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Sample Collected:	05/02/1994	Findings:	37.000 MG/L
Chemical:	SODIUM		
Sample Collected:	05/02/1994	Findings:	2.300 MG/L
Chemical:	POTASSIUM		
Sample Collected:	05/02/1994	Findings:	44.000 MG/L
Chemical:	CHLORIDE		
Sample Collected:	05/02/1994	Findings:	13.100 MG/L
Chemical:	SILICA		
Sample Collected:	05/02/1994	Findings:	190.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	06/06/1994	Findings:	21.800 C
Chemical:	SOURCE TEMPERATURE C		
Sample Collected:	06/06/1994	Findings:	410.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	06/06/1994	Findings:	7.700
Chemical:	FIELD PH		
Sample Collected:	06/06/1994	Findings:	7.700
Chemical:	PH (LABORATORY)		
Sample Collected:	06/06/1994	Findings:	70.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	06/06/1994	Findings:	96.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	06/06/1994	Findings:	14.000 MG/L
Chemical:	CALCIUM		
Sample Collected:	06/06/1994	Findings:	11.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	06/06/1994	Findings:	41.000 MG/L
Chemical:	SODIUM		
Sample Collected:	06/06/1994	Findings:	2.500 MG/L
Chemical:	POTASSIUM		
Sample Collected:	06/06/1994	Findings:	50.000 MG/L
Chemical:	CHLORIDE		
Sample Collected:	06/06/1994	Findings:	2.800 MG/L
Chemical:	SILICA		
Sample Collected:	06/06/1994	Findings:	200.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	06/06/1994	Findings:	.140 MG/L
Chemical:	BROMIDE		
Sample Collected:	07/11/1994	Findings:	23.100 C
Chemical:	SOURCE TEMPERATURE C		
Sample Collected:	07/11/1994	Findings:	15.000 UNITS
Chemical:	COLOR		
Sample Collected:	07/11/1994	Findings:	580.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	07/11/1994	Findings:	7.900
Chemical:	FIELD PH		

Sample Collected: 07/11/1994 Findings: 7.900
Chemical: PH (LABORATORY)

Sample Collected: 07/11/1994 Findings: 66.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 07/11/1994 Findings: 66.000 MG/L
Chemical: BICARBONATE ALKALINITY

Sample Collected: 07/11/1994 Findings: .260 UG/L
Chemical: PHOSPHATE

Sample Collected: 07/11/1994 Findings: 102.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 07/11/1994 Findings: 12.000 MG/L
Chemical: CALCIUM

Sample Collected: 07/11/1994 Findings: 14.000 MG/L
Chemical: MAGNESIUM

Sample Collected: 07/11/1994 Findings: 68.000 MG/L
Chemical: SODIUM

Sample Collected: 07/11/1994 Findings: 3.500 MG/L
Chemical: POTASSIUM

Sample Collected: 07/11/1994 Findings: 110.000 MG/L
Chemical: CHLORIDE

Sample Collected: 07/11/1994 Findings: 13.000 MG/L
Chemical: SILICA

Sample Collected: 07/11/1994 Findings: 2.700 UG/L
Chemical: ARSENIC

Sample Collected: 07/11/1994 Findings: 210.000 UG/L
Chemical: BORON

Sample Collected: 07/11/1994 Findings: 280.000 UG/L
Chemical: IRON

Sample Collected: 07/11/1994 Findings: 29.000 UG/L
Chemical: MANGANESE

Sample Collected: 07/11/1994 Findings: 280.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 07/11/1994 Findings: 8.510
Chemical: LANGELIER INDEX @ 60 C

Sample Collected: 07/11/1994 Findings: 5.000 NTU
Chemical: FIELD TURBIDITY

Sample Collected: 07/11/1994 Findings: .360 MG/L
Chemical: BROMIDE

Sample Collected: 07/11/1994 Findings: .060 UG/L
Chemical: FOAMING AGENTS (MBAS)

Sample Collected: 08/02/1994 Findings: 24.000 C
Chemical: SOURCE TEMPERATURE C

Sample Collected: 08/02/1994 Findings: 620.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 08/02/1994 Findings: 7.800
Chemical: FIELD PH

Sample Collected: 08/02/1994 Findings: 7.980
Chemical: PH (LABORATORY)

Sample Collected: 08/02/1994 Findings: 58.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 08/02/1994 Findings: .300 UG/L
Chemical: PHOSPHATE

Sample Collected: 08/02/1994 Findings: 100.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 08/02/1994 Findings: 9.100 MG/L
Chemical: CALCIUM

Sample Collected: 08/02/1994 Findings: 15.000 MG/L
Chemical: MAGNESIUM

Sample Collected: 08/02/1994 Findings: 80.000 MG/L
Chemical: SODIUM

Sample Collected: 08/02/1994 Findings: 3.900 MG/L
Chemical: POTASSIUM

Sample Collected: 08/02/1994 Findings: 140.000 MG/L
Chemical: CHLORIDE

Sample Collected: 08/02/1994 Findings: 12.000 MG/L
Chemical: SILICA

Sample Collected: 08/02/1994 Findings: 310.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 08/02/1994 Findings: .470 MG/L
Chemical: BROMIDE

Sample Collected: 09/12/1994 Findings: 910.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 09/12/1994 Findings: 7.760
Chemical: PH (LABORATORY)

Sample Collected: 09/12/1994 Findings: 67.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 09/12/1994 Findings: 124.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 09/12/1994 Findings: 12.000 MG/L
Chemical: CALCIUM

Sample Collected: 09/12/1994 Findings: 21.000 MG/L
Chemical: MAGNESIUM

Sample Collected: 09/12/1994 Findings: 130.000 MG/L
Chemical: SODIUM

Sample Collected: 09/12/1994 Findings: 5.400 MG/L
Chemical: POTASSIUM

Sample Collected: 09/12/1994 Findings: 200.000 MG/L
Chemical: CHLORIDE

Sample Collected: 09/12/1994 Findings: .110 MG/L
Chemical: FLUORIDE (TEMPERATURE DEPENDENT)

Sample Collected: 09/12/1994 Findings: 12.000 MG/L
Chemical: SILICA

Sample Collected:	09/12/1994	Findings:	450.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	09/12/1994	Findings:	.690 MG/L
Chemical:	BROMIDE		
Sample Collected:	10/03/1994	Findings:	21.000 C
Chemical:	SOURCE TEMPERATURE C		
Sample Collected:	10/03/1994	Findings:	10.000 UNITS
Chemical:	COLOR		
Sample Collected:	10/03/1994	Findings:	720.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	10/03/1994	Findings:	7.550
Chemical:	FIELD PH		
Sample Collected:	10/03/1994	Findings:	7.560
Chemical:	PH (LABORATORY)		
Sample Collected:	10/03/1994	Findings:	77.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	10/03/1994	Findings:	77.000 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	10/03/1994	Findings:	.200 UG/L
Chemical:	PHOSPHATE		
Sample Collected:	10/03/1994	Findings:	116.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	10/03/1994	Findings:	11.000 MG/L
Chemical:	CALCIUM		
Sample Collected:	10/03/1994	Findings:	17.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	10/03/1994	Findings:	95.000 MG/L
Chemical:	SODIUM		
Sample Collected:	10/03/1994	Findings:	4.500 MG/L
Chemical:	POTASSIUM		
Sample Collected:	10/03/1994	Findings:	150.000 MG/L
Chemical:	CHLORIDE		
Sample Collected:	10/03/1994	Findings:	15.000 MG/L
Chemical:	SILICA		
Sample Collected:	10/03/1994	Findings:	2.800 UG/L
Chemical:	ARSENIC		
Sample Collected:	10/03/1994	Findings:	230.000 UG/L
Chemical:	IRON		
Sample Collected:	10/03/1994	Findings:	350.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	10/03/1994	Findings:	8.520
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	10/03/1994	Findings:	.510 MG/L
Chemical:	BROMIDE		
Sample Collected:	10/03/1994	Findings:	5.000 PCI/L
Chemical:	GROSS BETA		

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Sample Collected:	11/14/1994	Findings:	680.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	11/14/1994	Findings:	7.800
Chemical:	PH (LABORATORY)		
Sample Collected:	11/14/1994	Findings:	71.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	11/14/1994	Findings:	112.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	11/14/1994	Findings:	11.000 MG/L
Chemical:	CALCIUM		
Sample Collected:	11/14/1994	Findings:	17.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	11/14/1994	Findings:	91.000 MG/L
Chemical:	SODIUM		
Sample Collected:	11/14/1994	Findings:	4.500 MG/L
Chemical:	POTASSIUM		
Sample Collected:	11/14/1994	Findings:	150.000 MG/L
Chemical:	CHLORIDE		
Sample Collected:	11/14/1994	Findings:	.120 MG/L
Chemical:	FLUORIDE (TEMPERATURE DEPENDENT)		
Sample Collected:	11/14/1994	Findings:	13.000 MG/L
Chemical:	SILICA		
Sample Collected:	11/14/1994	Findings:	350.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	11/14/1994	Findings:	.540 MG/L
Chemical:	BROMIDE		
Sample Collected:	12/05/1994	Findings:	9.800 C
Chemical:	SOURCE TEMPERATURE C		
Sample Collected:	12/05/1994	Findings:	720.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	12/05/1994	Findings:	7.860
Chemical:	FIELD PH		
Sample Collected:	12/05/1994	Findings:	7.690
Chemical:	PH (LABORATORY)		
Sample Collected:	12/05/1994	Findings:	72.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	12/05/1994	Findings:	118.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	12/05/1994	Findings:	18.000 MG/L
Chemical:	CALCIUM		
Sample Collected:	12/05/1994	Findings:	17.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	12/05/1994	Findings:	86.000 MG/L
Chemical:	SODIUM		
Sample Collected:	12/05/1994	Findings:	4.800 MG/L
Chemical:	POTASSIUM		

Sample Collected: 12/05/1994 Findings: 160.000 MG/L
Chemical: CHLORIDE

Sample Collected: 12/05/1994 Findings: .110 MG/L
Chemical: FLUORIDE (TEMPERATURE DEPENDENT)

Sample Collected: 12/05/1994 Findings: 13.000 MG/L
Chemical: SILICA

Sample Collected: 12/05/1994 Findings: 370.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 12/05/1994 Findings: 2.400 MG/L
Chemical: NITRATE (AS NO3)

Sample Collected: 12/05/1994 Findings: .540 MG/L
Chemical: BROMIDE

Sample Collected: 01/09/1995 Findings: 12.600 C
Chemical: SOURCE TEMPERATURE C

Sample Collected: 01/09/1995 Findings: 10.000 UNITS
Chemical: COLOR

Sample Collected: 01/09/1995 Findings: 480.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 01/09/1995 Findings: 7.800
Chemical: FIELD PH

Sample Collected: 01/09/1995 Findings: 7.820
Chemical: PH (LABORATORY)

Sample Collected: 01/09/1995 Findings: 71.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 01/09/1995 Findings: 71.000 MG/L
Chemical: BICARBONATE ALKALINITY

Sample Collected: 01/09/1995 Findings: .240 UG/L
Chemical: PHOSPHATE

Sample Collected: 01/09/1995 Findings: 100.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 01/09/1995 Findings: 11.000 MG/L
Chemical: CALCIUM

Sample Collected: 01/09/1995 Findings: 16.000 MG/L
Chemical: MAGNESIUM

Sample Collected: 01/09/1995 Findings: 61.000 MG/L
Chemical: SODIUM

Sample Collected: 01/09/1995 Findings: 4.000 MG/L
Chemical: POTASSIUM

Sample Collected: 01/09/1995 Findings: 93.000 MG/L
Chemical: CHLORIDE

Sample Collected: 01/09/1995 Findings: 20.000 MG/L
Chemical: SILICA

Sample Collected: 01/09/1995 Findings: 160.000 UG/L
Chemical: BORON

Sample Collected: 01/09/1995 Findings: 180.000 UG/L
Chemical: IRON

Sample Collected: 01/09/1995 Findings: 12.000 UG/L
Chemical: MANGANESE

Sample Collected: 01/09/1995 Findings: 260.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 01/09/1995 Findings: 8.660
Chemical: LANGELIER INDEX @ 60 C

Sample Collected: 01/09/1995 Findings: 3.300 MG/L
Chemical: NITRATE (AS NO3)

Sample Collected: 01/09/1995 Findings: 7.100 NTU
Chemical: FIELD TURBIDITY

Sample Collected: 01/09/1995 Findings: .270 MG/L
Chemical: BROMIDE

Sample Collected: 02/06/1995 Findings: 520.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 02/06/1995 Findings: 7.300
Chemical: PH (LABORATORY)

Sample Collected: 02/06/1995 Findings: 76.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 02/06/1995 Findings: .200 MG/L
Chemical: AMMONIA (NH3-N)

Sample Collected: 02/06/1995 Findings: .270 UG/L
Chemical: PHOSPHATE

Sample Collected: 02/06/1995 Findings: 118.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 02/06/1995 Findings: 20.000 MG/L
Chemical: CALCIUM

Sample Collected: 02/06/1995 Findings: 18.000 MG/L
Chemical: MAGNESIUM

Sample Collected: 02/06/1995 Findings: 50.000 MG/L
Chemical: SODIUM

Sample Collected: 02/06/1995 Findings: 3.700 MG/L
Chemical: POTASSIUM

Sample Collected: 02/06/1995 Findings: 66.000 MG/L
Chemical: CHLORIDE

Sample Collected: 02/06/1995 Findings: .120 MG/L
Chemical: FLUORIDE (TEMPERATURE DEPENDENT)

Sample Collected: 02/06/1995 Findings: 22.000 MG/L
Chemical: SILICA

Sample Collected: 02/06/1995 Findings: 290.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 02/06/1995 Findings: 8.500 MG/L
Chemical: NITRATE (AS NO3)

Sample Collected: 02/06/1995 Findings: .110 MG/L
Chemical: BROMIDE

Sample Collected: 03/06/1995 Findings: 16.300 C
Chemical: SOURCE TEMPERATURE C

Sample Collected:	03/06/1995	Findings:	480.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	03/06/1995	Findings:	7.350
Chemical:	FIELD PH		
Sample Collected:	03/06/1995	Findings:	7.590
Chemical:	PH (LABORATORY)		
Sample Collected:	03/06/1995	Findings:	76.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	03/06/1995	Findings:	118.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	03/06/1995	Findings:	12.000 MG/L
Chemical:	CALCIUM		
Sample Collected:	03/06/1995	Findings:	16.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	03/06/1995	Findings:	50.000 MG/L
Chemical:	SODIUM		
Sample Collected:	03/06/1995	Findings:	2.800 MG/L
Chemical:	POTASSIUM		
Sample Collected:	03/06/1995	Findings:	59.000 MG/L
Chemical:	CHLORIDE		
Sample Collected:	03/06/1995	Findings:	.110 MG/L
Chemical:	FLUORIDE (TEMPERATURE DEPENDENT)		
Sample Collected:	03/06/1995	Findings:	20.000 MG/L
Chemical:	SILICA		
Sample Collected:	03/06/1995	Findings:	260.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	03/06/1995	Findings:	5.200 MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	03/06/1995	Findings:	.130 MG/L
Chemical:	BROMIDE		
Sample Collected:	04/03/1995	Findings:	18.100 C
Chemical:	SOURCE TEMPERATURE C		
Sample Collected:	04/03/1995	Findings:	30.000 UNITS
Chemical:	COLOR		
Sample Collected:	04/03/1995	Findings:	760.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	04/03/1995	Findings:	7.900
Chemical:	FIELD PH		
Sample Collected:	04/03/1995	Findings:	7.860
Chemical:	PH (LABORATORY)		
Sample Collected:	04/03/1995	Findings:	104.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	04/03/1995	Findings:	104.000 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	04/03/1995	Findings:	.310 UG/L
Chemical:	PHOSPHATE		

Sample Collected: 04/03/1995 Findings: 176.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 04/03/1995 Findings: 27.000 MG/L
Chemical: CALCIUM

Sample Collected: 04/03/1995 Findings: 23.000 MG/L
Chemical: MAGNESIUM

Sample Collected: 04/03/1995 Findings: 88.000 MG/L
Chemical: SODIUM

Sample Collected: 04/03/1995 Findings: 4.400 MG/L
Chemical: POTASSIUM

Sample Collected: 04/03/1995 Findings: 94.000 MG/L
Chemical: CHLORIDE

Sample Collected: 04/03/1995 Findings: .180 MG/L
Chemical: FLUORIDE (TEMPERATURE DEPENDENT)

Sample Collected: 04/03/1995 Findings: 12.000 MG/L
Chemical: SILICA

Sample Collected: 04/03/1995 Findings: 760.000 UG/L
Chemical: BORON

Sample Collected: 04/03/1995 Findings: 490.000 UG/L
Chemical: IRON

Sample Collected: 04/03/1995 Findings: 36.000 UG/L
Chemical: MANGANESE

Sample Collected: 04/03/1995 Findings: 230.000 UG/L
Chemical: ALUMINUM

Sample Collected: 04/03/1995 Findings: 420.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 04/03/1995 Findings: 8.050
Chemical: LANGELIER INDEX @ 60 C

Sample Collected: 04/03/1995 Findings: 9.000 MG/L
Chemical: NITRATE (AS NO3)

Sample Collected: 04/03/1995 Findings: .190 MG/L
Chemical: BROMIDE

Sample Collected: 04/03/1995 Findings: .083 UG/L
Chemical: FOAMING AGENTS (MBAS)

Sample Collected: 05/01/1995 Findings: 330.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 05/01/1995 Findings: 7.670
Chemical: PH (LABORATORY)

Sample Collected: 05/01/1995 Findings: 56.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 05/01/1995 Findings: .240 UG/L
Chemical: PHOSPHATE

Sample Collected: 05/01/1995 Findings: 74.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 05/01/1995 Findings: 11.000 MG/L
Chemical: CALCIUM

Sample Collected: 05/01/1995 Findings: 9.900 MG/L
Chemical: MAGNESIUM

Sample Collected: 05/01/1995 Findings: 34.000 MG/L
Chemical: SODIUM

Sample Collected: 05/01/1995 Findings: 1.800 MG/L
Chemical: POTASSIUM

Sample Collected: 05/01/1995 Findings: 34.000 MG/L
Chemical: CHLORIDE

Sample Collected: 05/01/1995 Findings: .120 MG/L
Chemical: FLUORIDE (TEMPERATURE DEPENDENT)

Sample Collected: 05/01/1995 Findings: 9.800 MG/L
Chemical: SILICA

Sample Collected: 05/01/1995 Findings: 170.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 05/01/1995 Findings: 2.700 MG/L
Chemical: NITRATE (AS NO3)

Sample Collected: 06/05/1995 Findings: 200.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 06/05/1995 Findings: 7.420
Chemical: FIELD PH

Sample Collected: 06/05/1995 Findings: 7.420
Chemical: PH (LABORATORY)

Sample Collected: 06/05/1995 Findings: 39.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 06/05/1995 Findings: .260 UG/L
Chemical: PHOSPHATE

Sample Collected: 06/05/1995 Findings: 46.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 06/05/1995 Findings: 6.500 MG/L
Chemical: CALCIUM

Sample Collected: 06/05/1995 Findings: 6.800 MG/L
Chemical: MAGNESIUM

Sample Collected: 06/05/1995 Findings: 19.000 MG/L
Chemical: SODIUM

Sample Collected: 06/05/1995 Findings: 1.500 MG/L
Chemical: POTASSIUM

Sample Collected: 06/05/1995 Findings: 19.000 MG/L
Chemical: CHLORIDE

Sample Collected: 06/05/1995 Findings: 11.000 MG/L
Chemical: SILICA

Sample Collected: 06/05/1995 Findings: 100.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 07/10/1995 Findings: 5.000 UNITS
Chemical: COLOR

Sample Collected: 07/10/1995 Findings: 160.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 07/10/1995 Findings: 7.600
Chemical: FIELD PH

Sample Collected: 07/10/1995 Findings: 7.600
Chemical: PH (LABORATORY)

Sample Collected: 07/10/1995 Findings: 38.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 07/10/1995 Findings: 38.000 MG/L
Chemical: BICARBONATE ALKALINITY

Sample Collected: 07/10/1995 Findings: .110 MG/L
Chemical: AMMONIA (NH3-N)

Sample Collected: 07/10/1995 Findings: 54.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 07/10/1995 Findings: 4.200 MG/L
Chemical: CALCIUM

Sample Collected: 07/10/1995 Findings: 5.900 MG/L
Chemical: MAGNESIUM

Sample Collected: 07/10/1995 Findings: 14.000 MG/L
Chemical: SODIUM

Sample Collected: 07/10/1995 Findings: 1.200 MG/L
Chemical: POTASSIUM

Sample Collected: 07/10/1995 Findings: 15.000 MG/L
Chemical: CHLORIDE

Sample Collected: 07/10/1995 Findings: 12.000 MG/L
Chemical: SILICA

Sample Collected: 07/10/1995 Findings: 450.000 UG/L
Chemical: IRON

Sample Collected: 07/10/1995 Findings: 43.000 UG/L
Chemical: MANGANESE

Sample Collected: 07/10/1995 Findings: 200.000 UG/L
Chemical: ALUMINUM

Sample Collected: 07/10/1995 Findings: 80.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 07/10/1995 Findings: 9.470
Chemical: LANGELIER INDEX @ 60 C

Sample Collected: 07/10/1995 Findings: .200 PCI/L
Chemical: GROSS ALPHA COUNTING ERROR

Sample Collected: 07/10/1995 Findings: .400 PCI/L
Chemical: GROSS BETA COUNTING ERROR

Sample Collected: 07/10/1995 Findings: 113.000 PCI/L
Chemical: TRITIUM

Sample Collected: 07/10/1995 Findings: 38.000 PCI/L
Chemical: TRITIUM COUNTING ERROR

Sample Collected: 07/10/1995 Findings: .700 PCI/L
Chemical: RADIUM 226 COUNTING ERROR

Sample Collected: 07/10/1995 Findings: .900 PCI/L
Chemical: RADIUM 228

Sample Collected: 07/10/1995 Findings: .400 PCI/L
Chemical: RADIUM 228 COUNTING ERROR

Sample Collected: 07/10/1995 Findings: .200 PCI/L
Chemical: STRONTIUM-90 COUNTING ERROR

Sample Collected: 07/10/1995 Findings: 105.000 PCI/L
Chemical: TOTAL RADON 222 COUNTING ERROR

Sample Collected: 07/10/1995 Findings: 239.000 PCI/L
Chemical: TOTAL RADON 222

Sample Collected: 07/10/1995 Findings: .100 PCI/L
Chemical: URANIUM COUNTING ERROR

Sample Collected: 07/10/1995 Findings: 113.000 PCI/L
Chemical: TRITIUM

Sample Collected: 07/10/1995 Findings: .900 PCI/L
Chemical: RA 226 + RA 228

Sample Collected: 08/07/1995 Findings: 150.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 08/07/1995 Findings: 7.510
Chemical: FIELD PH

Sample Collected: 08/07/1995 Findings: 7.510
Chemical: PH (LABORATORY)

Sample Collected: 08/07/1995 Findings: 36.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 08/07/1995 Findings: 38.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 08/07/1995 Findings: 3.800 MG/L
Chemical: CALCIUM

Sample Collected: 08/07/1995 Findings: 5.400 MG/L
Chemical: MAGNESIUM

Sample Collected: 08/07/1995 Findings: 12.000 MG/L
Chemical: SODIUM

Sample Collected: 08/07/1995 Findings: 1.000 MG/L
Chemical: POTASSIUM

Sample Collected: 08/07/1995 Findings: 12.000 MG/L
Chemical: CHLORIDE

Sample Collected: 08/07/1995 Findings: 15.000 MG/L
Chemical: SILICA

Sample Collected: 08/07/1995 Findings: 70.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 09/11/1995 Findings: 22.000 C
Chemical: SOURCE TEMPERATURE C

Sample Collected: 09/11/1995 Findings: 200.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 09/11/1995 Findings: 7.770
Chemical: FIELD PH

Sample Collected: 09/11/1995 Findings: 7.650
Chemical: PH (LABORATORY)

Sample Collected: 09/11/1995 Findings: 58.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 09/11/1995 Findings: .380 UG/L
Chemical: PHOSPHATE

Sample Collected: 09/11/1995 Findings: 56.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 09/11/1995 Findings: 4.600 MG/L
Chemical: CALCIUM

Sample Collected: 09/11/1995 Findings: 9.000 MG/L
Chemical: MAGNESIUM

Sample Collected: 09/11/1995 Findings: 15.000 MG/L
Chemical: SODIUM

Sample Collected: 09/11/1995 Findings: 1.300 MG/L
Chemical: POTASSIUM

Sample Collected: 09/11/1995 Findings: 16.000 MG/L
Chemical: CHLORIDE

Sample Collected: 09/11/1995 Findings: 14.000 MG/L
Chemical: SILICA

Sample Collected: 09/11/1995 Findings: 90.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 10/02/1995 Findings: 21.800 C
Chemical: SOURCE TEMPERATURE C

Sample Collected: 10/02/1995 Findings: 15.000 UNITS
Chemical: COLOR

Sample Collected: 10/02/1995 Findings: 190.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 10/02/1995 Findings: 7.520
Chemical: FIELD PH

Sample Collected: 10/02/1995 Findings: 7.480
Chemical: PH (LABORATORY)

Sample Collected: 10/02/1995 Findings: 48.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 10/02/1995 Findings: 48.000 MG/L
Chemical: BICARBONATE ALKALINITY

Sample Collected: 10/02/1995 Findings: 52.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 10/02/1995 Findings: 6.200 MG/L
Chemical: CALCIUM

Sample Collected: 10/02/1995 Findings: 6.600 MG/L
Chemical: MAGNESIUM

Sample Collected: 10/02/1995 Findings: 18.000 MG/L
Chemical: SODIUM

Sample Collected: 10/02/1995 Findings: 1.200 MG/L
Chemical: POTASSIUM

Sample Collected: 10/02/1995 Findings: 15.000 MG/L
Chemical: CHLORIDE

Sample Collected: 10/02/1995 Findings: 14.000 MG/L
Chemical: SILICA

Sample Collected: 10/02/1995 Findings: 200.000 UG/L
Chemical: IRON

Sample Collected: 10/02/1995 Findings: 24.000 UG/L
Chemical: MANGANESE

Sample Collected: 10/02/1995 Findings: 440.000 UG/L
Chemical: ALUMINUM

Sample Collected: 10/02/1995 Findings: 100.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 10/02/1995 Findings: 8.890
Chemical: LANGELIER INDEX @ 60 C

Sample Collected: 10/02/1995 Findings: 7.400 NTU
Chemical: FIELD TURBIDITY

Sample Collected: 10/02/1995 Findings: 74.000 UG/L
Chemical: BORON

Sample Collected: 11/06/1995 Findings: 8.130 C
Chemical: SOURCE TEMPERATURE C

Sample Collected: 11/06/1995 Findings: 180.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 11/06/1995 Findings: 15.700
Chemical: FIELD PH

Sample Collected: 11/06/1995 Findings: 7.850
Chemical: PH (LABORATORY)

Sample Collected: 11/06/1995 Findings: 47.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 11/06/1995 Findings: 48.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 11/06/1995 Findings: 6.800 MG/L
Chemical: CALCIUM

Sample Collected: 11/06/1995 Findings: 6.200 MG/L
Chemical: MAGNESIUM

Sample Collected: 11/06/1995 Findings: 16.000 MG/L
Chemical: SODIUM

Sample Collected: 11/06/1995 Findings: 1.400 MG/L
Chemical: POTASSIUM

Sample Collected: 11/06/1995 Findings: 17.000 MG/L
Chemical: CHLORIDE

Sample Collected: 11/06/1995 Findings: 12.000 MG/L
Chemical: SILICA

Sample Collected: 11/06/1995 Findings: 90.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 12/04/1995 Findings: 180.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 12/04/1995 Findings: 7.700
Chemical: PH (LABORATORY)

Sample Collected: 12/04/1995 Findings: 57.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 12/04/1995 Findings: .150 MG/L
Chemical: AMMONIA (NH3-N)

Sample Collected: 12/04/1995 Findings: 58.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 12/04/1995 Findings: 8.600 MG/L
Chemical: CALCIUM

Sample Collected: 12/04/1995 Findings: 6.600 MG/L
Chemical: MAGNESIUM

Sample Collected: 12/04/1995 Findings: 15.000 MG/L
Chemical: SODIUM

Sample Collected: 12/04/1995 Findings: 1.500 MG/L
Chemical: POTASSIUM

Sample Collected: 12/04/1995 Findings: 19.000 MG/L
Chemical: CHLORIDE

Sample Collected: 12/04/1995 Findings: 13.000 MG/L
Chemical: SILICA

Sample Collected: 12/04/1995 Findings: 100.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 01/08/1996 Findings: 10.700 C
Chemical: SOURCE TEMPERATURE C

Sample Collected: 01/08/1996 Findings: 20.000 UNITS
Chemical: COLOR

Sample Collected: 01/08/1996 Findings: 270.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 01/08/1996 Findings: 7.650
Chemical: FIELD PH

Sample Collected: 01/08/1996 Findings: 7.690
Chemical: PH (LABORATORY)

Sample Collected: 01/08/1996 Findings: 64.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 01/08/1996 Findings: 64.000 MG/L
Chemical: BICARBONATE ALKALINITY

Sample Collected: 01/08/1996 Findings: 76.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 01/08/1996 Findings: 9.800 MG/L
Chemical: CALCIUM

Sample Collected: 01/08/1996 Findings: 9.100 MG/L
Chemical: MAGNESIUM

Sample Collected: 01/08/1996 Findings: 23.000 MG/L
Chemical: SODIUM

Sample Collected: 01/08/1996 Findings: 2.200 MG/L
Chemical: POTASSIUM

Sample Collected: 01/08/1996 Findings: 26.000 MG/L
Chemical: CHLORIDE

Sample Collected:	01/08/1996	Findings:	16.000 MG/L
Chemical:	SILICA		
Sample Collected:	01/08/1996	Findings:	2.200 UG/L
Chemical:	ARSENIC		
Sample Collected:	01/08/1996	Findings:	250.000 UG/L
Chemical:	IRON		
Sample Collected:	01/08/1996	Findings:	25.000 UG/L
Chemical:	MANGANESE		
Sample Collected:	01/08/1996	Findings:	350.000 UG/L
Chemical:	ALUMINUM		
Sample Collected:	01/08/1996	Findings:	140.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	01/08/1996	Findings:	8.750
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	01/08/1996	Findings:	3.700 MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	01/08/1996	Findings:	7.600 NTU
Chemical:	FIELD TURBIDITY		
Sample Collected:	01/08/1996	Findings:	80.000 UG/L
Chemical:	BORON		
Sample Collected:	01/08/1996	Findings:	121.000 PCI/L
Chemical:	TRITIUM		
Sample Collected:	01/08/1996	Findings:	.200 PCI/L
Chemical:	RA 226 + RA 228		
Sample Collected:	02/05/1996	Findings:	13.400 C
Chemical:	SOURCE TEMPERATURE C		
Sample Collected:	02/05/1996	Findings:	370.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	02/05/1996	Findings:	7.530
Chemical:	FIELD PH		
Sample Collected:	02/05/1996	Findings:	7.540
Chemical:	PH (LABORATORY)		
Sample Collected:	02/05/1996	Findings:	72.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	02/05/1996	Findings:	102.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	02/05/1996	Findings:	14.000 MG/L
Chemical:	CALCIUM		
Sample Collected:	02/05/1996	Findings:	15.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	02/05/1996	Findings:	34.000 MG/L
Chemical:	SODIUM		
Sample Collected:	02/05/1996	Findings:	2.400 MG/L
Chemical:	POTASSIUM		
Sample Collected:	02/05/1996	Findings:	42.000 MG/L
Chemical:	CHLORIDE		

Sample Collected: 02/05/1996 Findings: .110 MG/L
Chemical: FLUORIDE (TEMPERATURE DEPENDENT)

Sample Collected: 02/05/1996 Findings: 19.000 MG/L
Chemical: SILICA

Sample Collected: 02/05/1996 Findings: 200.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 02/05/1996 Findings: 4.100 MG/L
Chemical: NITRATE (AS NO3)

Sample Collected: 02/05/1996 Findings: .120 MG/L
Chemical: BROMIDE

Sample Collected: 03/04/1996 Findings: 710.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 03/04/1996 Findings: 8.100
Chemical: PH (LABORATORY)

Sample Collected: 03/04/1996 Findings: 100.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 03/04/1996 Findings: .220 UG/L
Chemical: PHOSPHATE

Sample Collected: 03/04/1996 Findings: 158.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 03/04/1996 Findings: 26.000 MG/L
Chemical: CALCIUM

Sample Collected: 03/04/1996 Findings: 20.000 MG/L
Chemical: MAGNESIUM

Sample Collected: 03/04/1996 Findings: 81.000 MG/L
Chemical: SODIUM

Sample Collected: 03/04/1996 Findings: 3.100 MG/L
Chemical: POTASSIUM

Sample Collected: 03/04/1996 Findings: 92.000 MG/L
Chemical: CHLORIDE

Sample Collected: 03/04/1996 Findings: .210 MG/L
Chemical: FLUORIDE (TEMPERATURE DEPENDENT)

Sample Collected: 03/04/1996 Findings: 16.000 MG/L
Chemical: SILICA

Sample Collected: 03/04/1996 Findings: 390.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 03/04/1996 Findings: 8.900 MG/L
Chemical: NITRATE (AS NO3)

Sample Collected: 03/04/1996 Findings: .310 MG/L
Chemical: BROMIDE

Sample Collected: 04/01/1996 Findings: 16.200 C
Chemical: SOURCE TEMPERATURE C

Sample Collected: 04/01/1996 Findings: 10.000 UNITS
Chemical: COLOR

Sample Collected: 04/01/1996 Findings: 540.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 04/01/1996 Findings: 8.200
Chemical: FIELD PH

Sample Collected: 04/01/1996 Findings: 8.110
Chemical: PH (LABORATORY)

Sample Collected: 04/01/1996 Findings: 77.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 04/01/1996 Findings: 77.000 MG/L
Chemical: BICARBONATE ALKALINITY

Sample Collected: 04/01/1996 Findings: 122.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 04/01/1996 Findings: 15.000 MG/L
Chemical: CALCIUM

Sample Collected: 04/01/1996 Findings: 15.000 MG/L
Chemical: MAGNESIUM

Sample Collected: 04/01/1996 Findings: 58.000 MG/L
Chemical: SODIUM

Sample Collected: 04/01/1996 Findings: 1.900 MG/L
Chemical: POTASSIUM

Sample Collected: 04/01/1996 Findings: 70.000 MG/L
Chemical: CHLORIDE

Sample Collected: 04/01/1996 Findings: .120 MG/L
Chemical: FLUORIDE (TEMPERATURE DEPENDENT)

Sample Collected: 04/01/1996 Findings: 8.600 MG/L
Chemical: SILICA

Sample Collected: 04/01/1996 Findings: 230.000 UG/L
Chemical: IRON

Sample Collected: 04/01/1996 Findings: 42.000 UG/L
Chemical: MANGANESE

Sample Collected: 04/01/1996 Findings: 130.000 UG/L
Chemical: ALUMINUM

Sample Collected: 04/01/1996 Findings: 280.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 04/01/1996 Findings: 8.440
Chemical: LANGELIER INDEX @ 60 C

Sample Collected: 04/01/1996 Findings: 2.900 MG/L
Chemical: NITRATE (AS NO3)

Sample Collected: 04/01/1996 Findings: 5.200 UG/L
Chemical: BORON

Sample Collected: 04/01/1996 Findings: 1.850 PCI/L
Chemical: GROSS ALPHA

Sample Collected: 04/01/1996 Findings: 207.000 PCI/L
Chemical: TRITIUM

Sample Collected: 04/01/1996 Findings: .160 PCI/L
Chemical: RA 226 + RA 228

Sample Collected: 05/06/1996 Findings: 20.800 C
Chemical: SOURCE TEMPERATURE C

GEOCHECK VERSION 2.1
STATE DATABASE WELL INFORMATION

Sample Collected: 05/06/1996 Findings: 470.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 05/06/1996 Findings: 7.600
Chemical: FIELD PH

Sample Collected: 05/06/1996 Findings: 7.880
Chemical: PH (LABORATORY)

Sample Collected: 05/06/1996 Findings: 67.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 05/06/1996 Findings: .150 MG/L
Chemical: AMMONIA (NH3-N)

Sample Collected: 05/06/1996 Findings: .200 UG/L
Chemical: PHOSPHATE

Sample Collected: 05/06/1996 Findings: 102.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 05/06/1996 Findings: 14.000 MG/L
Chemical: CALCIUM

Sample Collected: 05/06/1996 Findings: 12.000 MG/L
Chemical: MAGNESIUM

Sample Collected: 05/06/1996 Findings: 52.000 MG/L
Chemical: SODIUM

Sample Collected: 05/06/1996 Findings: 2.000 MG/L
Chemical: POTASSIUM

Sample Collected: 05/06/1996 Findings: 60.000 MG/L
Chemical: CHLORIDE

Sample Collected: 05/06/1996 Findings: .190 MG/L
Chemical: FLUORIDE (TEMPERATURE DEPENDENT)

Sample Collected: 05/06/1996 Findings: 8.700 MG/L
Chemical: SILICA

Sample Collected: 05/06/1996 Findings: 250.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 05/06/1996 Findings: 3.000 MG/L
Chemical: NITRATE (AS NO3)

Sample Collected: 05/06/1996 Findings: .220 MG/L
Chemical: BROMIDE

Sample Collected: 06/03/1996 Findings: 23.000 C
Chemical: SOURCE TEMPERATURE C

Sample Collected: 06/03/1996 Findings: 240.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 06/03/1996 Findings: 7.700
Chemical: FIELD PH

Sample Collected: 06/03/1996 Findings: 7.570
Chemical: PH (LABORATORY)

Sample Collected: 06/03/1996 Findings: 47.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 06/03/1996 Findings: .200 UG/L
Chemical: PHOSPHATE

Sample Collected: 06/03/1996 Findings: 56.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 06/03/1996 Findings: 9.900 MG/L
Chemical: CALCIUM

Sample Collected: 06/03/1996 Findings: 6.400 MG/L
Chemical: MAGNESIUM

Sample Collected: 06/03/1996 Findings: 20.000 MG/L
Chemical: SODIUM

Sample Collected: 06/03/1996 Findings: 1.800 MG/L
Chemical: POTASSIUM

Sample Collected: 06/03/1996 Findings: 25.000 MG/L
Chemical: CHLORIDE

Sample Collected: 06/03/1996 Findings: 10.000 MG/L
Chemical: SILICA

Sample Collected: 06/03/1996 Findings: 120.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 06/03/1996 Findings: .120 MG/L
Chemical: BROMIDE

Sample Collected: 07/08/1996 Findings: 26.200 C
Chemical: SOURCE TEMPERATURE C

Sample Collected: 07/08/1996 Findings: 10.000 UNITS
Chemical: COLOR

Sample Collected: 07/08/1996 Findings: 170.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 07/08/1996 Findings: 7.550
Chemical: FIELD PH

Sample Collected: 07/08/1996 Findings: 7.900
Chemical: PH (LABORATORY)

Sample Collected: 07/08/1996 Findings: 50.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 07/08/1996 Findings: 50.000 MG/L
Chemical: BICARBONATE ALKALINITY

Sample Collected: 07/08/1996 Findings: 50.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 07/08/1996 Findings: 6.200 MG/L
Chemical: CALCIUM

Sample Collected: 07/08/1996 Findings: 6.100 MG/L
Chemical: MAGNESIUM

Sample Collected: 07/08/1996 Findings: 12.000 MG/L
Chemical: SODIUM

Sample Collected: 07/08/1996 Findings: 1.300 MG/L
Chemical: POTASSIUM

Sample Collected: 07/08/1996 Findings: 12.000 MG/L
Chemical: CHLORIDE

Sample Collected: 07/08/1996 Findings: 15.000 MG/L
Chemical: SILICA

Sample Collected: 07/08/1996 Findings: 260.000 UG/L
Chemical: IRON

Sample Collected: 07/08/1996 Findings: 28.000 UG/L
Chemical: MANGANESE

Sample Collected: 07/08/1996 Findings: 660.000 UG/L
Chemical: ALUMINUM

Sample Collected: 07/08/1996 Findings: 80.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 07/08/1996 Findings: 8.800
Chemical: LANGELIER INDEX @ 60 C

Sample Collected: 07/08/1996 Findings: 33.000 UG/L
Chemical: BORON

Sample Collected: 07/08/1996 Findings: 1.100 MFL
Chemical: ASBESTOS

Sample Collected: 08/05/1996 Findings: 220.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 08/05/1996 Findings: 7.690
Chemical: PH (LABORATORY)

Sample Collected: 08/05/1996 Findings: 51.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 08/05/1996 Findings: 52.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 08/05/1996 Findings: 7.100 MG/L
Chemical: CALCIUM

Sample Collected: 08/05/1996 Findings: 6.600 MG/L
Chemical: MAGNESIUM

Sample Collected: 08/05/1996 Findings: 18.000 MG/L
Chemical: SODIUM

Sample Collected: 08/05/1996 Findings: 2.500 MG/L
Chemical: POTASSIUM

Sample Collected: 08/05/1996 Findings: 26.000 MG/L
Chemical: CHLORIDE

Sample Collected: 08/05/1996 Findings: 18.000 MG/L
Chemical: SILICA

Sample Collected: 08/05/1996 Findings: 100.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 09/09/1996 Findings: 25.500 C
Chemical: SOURCE TEMPERATURE C

Sample Collected: 09/09/1996 Findings: 270.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 09/09/1996 Findings: 7.530
Chemical: FIELD PH

Sample Collected: 09/09/1996 Findings: 7.600
Chemical: PH (LABORATORY)

Sample Collected: 09/09/1996 Findings: 58.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected:	09/09/1996	Findings:	.120 MG/L
Chemical:	AMMONIA (NH3-N)		
Sample Collected:	09/09/1996	Findings:	62.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	09/09/1996	Findings:	9.000 MG/L
Chemical:	CALCIUM		
Sample Collected:	09/09/1996	Findings:	8.200 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	09/09/1996	Findings:	25.000 MG/L
Chemical:	SODIUM		
Sample Collected:	09/09/1996	Findings:	1.800 MG/L
Chemical:	POTASSIUM		
Sample Collected:	09/09/1996	Findings:	34.000 MG/L
Chemical:	CHLORIDE		
Sample Collected:	09/09/1996	Findings:	15.000 MG/L
Chemical:	SILICA		
Sample Collected:	09/09/1996	Findings:	130.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	09/09/1996	Findings:	.100 MG/L
Chemical:	BROMIDE		
Sample Collected:	10/07/1996	Findings:	34.000 C
Chemical:	SOURCE TEMPERATURE C		
Sample Collected:	10/07/1996	Findings:	10.000 UNITS
Chemical:	COLOR		
Sample Collected:	10/07/1996	Findings:	320.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	10/07/1996	Findings:	7.800
Chemical:	FIELD PH		
Sample Collected:	10/07/1996	Findings:	7.830
Chemical:	PH (LABORATORY)		
Sample Collected:	10/07/1996	Findings:	68.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	10/07/1996	Findings:	68.000 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	10/07/1996	Findings:	.110 MG/L
Chemical:	AMMONIA (NH3-N)		
Sample Collected:	10/07/1996	Findings:	74.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	10/07/1996	Findings:	9.200 MG/L
Chemical:	CALCIUM		
Sample Collected:	10/07/1996	Findings:	10.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	10/07/1996	Findings:	32.000 MG/L
Chemical:	SODIUM		
Sample Collected:	10/07/1996	Findings:	16.000 MG/L
Chemical:	POTASSIUM		

GEOCHECK VERSION 2.1
STATE DATABASE WELL INFORMATION

Sample Collected:	10/07/1996	Findings:	42.000 MG/L
Chemical:	CHLORIDE		
Sample Collected:	10/07/1996	Findings:	15.000 MG/L
Chemical:	SILICA		
Sample Collected:	10/07/1996	Findings:	320.000 UG/L
Chemical:	IRON		
Sample Collected:	10/07/1996	Findings:	38.000 UG/L
Chemical:	MANGANESE		
Sample Collected:	10/07/1996	Findings:	200.000 UG/L
Chemical:	ALUMINUM		
Sample Collected:	10/07/1996	Findings:	170.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	10/07/1996	Findings:	8.420
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	10/07/1996	Findings:	.160 MG/L
Chemical:	BROMIDE		
Sample Collected:	10/07/1996	Findings:	55.000 UG/L
Chemical:	BORON		
Sample Collected:	10/07/1996	Findings:	17.800 PCI/L
Chemical:	TRITIUM		
Sample Collected:	11/04/1996	Findings:	14.000 C
Chemical:	SOURCE TEMPERATURE C		
Sample Collected:	11/04/1996	Findings:	440.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	11/04/1996	Findings:	7.960
Chemical:	FIELD PH		
Sample Collected:	11/04/1996	Findings:	7.960
Chemical:	PH (LABORATORY)		
Sample Collected:	11/04/1996	Findings:	61.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	11/04/1996	Findings:	84.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	11/04/1996	Findings:	9.600 MG/L
Chemical:	CALCIUM		
Sample Collected:	11/04/1996	Findings:	12.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	11/04/1996	Findings:	51.000 MG/L
Chemical:	SODIUM		
Sample Collected:	11/04/1996	Findings:	2.700 MG/L
Chemical:	POTASSIUM		
Sample Collected:	11/04/1996	Findings:	81.000 MG/L
Chemical:	CHLORIDE		
Sample Collected:	11/04/1996	Findings:	14.000 MG/L
Chemical:	SILICA		
Sample Collected:	11/04/1996	Findings:	220.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		

Sample Collected:	11/04/1996	Findings:	.190 MG/L
Chemical:	BROMIDE		
Sample Collected:	12/02/1996	Findings:	11.500 C
Chemical:	SOURCE TEMPERATURE C		
Sample Collected:	12/02/1996	Findings:	690.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	12/02/1996	Findings:	8.150
Chemical:	FIELD PH		
Sample Collected:	12/02/1996	Findings:	8.070
Chemical:	PH (LABORATORY)		
Sample Collected:	12/02/1996	Findings:	66.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	12/02/1996	Findings:	.200 UG/L
Chemical:	PHOSPHATE		
Sample Collected:	12/02/1996	Findings:	112.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	12/02/1996	Findings:	12.000 MG/L
Chemical:	CALCIUM		
Sample Collected:	12/02/1996	Findings:	17.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	12/02/1996	Findings:	87.000 MG/L
Chemical:	SODIUM		
Sample Collected:	12/02/1996	Findings:	4.300 MG/L
Chemical:	POTASSIUM		
Sample Collected:	12/02/1996	Findings:	150.000 MG/L
Chemical:	CHLORIDE		
Sample Collected:	12/02/1996	Findings:	16.000 MG/L
Chemical:	SILICA		
Sample Collected:	12/02/1996	Findings:	360.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	12/02/1996	Findings:	2.200 MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	12/02/1996	Findings:	.480 MG/L
Chemical:	BROMIDE		
Sample Collected:	02/03/1997	Findings:	13.000 C
Chemical:	SOURCE TEMPERATURE C		
Sample Collected:	02/03/1997	Findings:	40.000 UNITS
Chemical:	COLOR		
Sample Collected:	02/03/1997	Findings:	590.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	02/03/1997	Findings:	7.500
Chemical:	FIELD PH		
Sample Collected:	02/03/1997	Findings:	7.280
Chemical:	PH (LABORATORY)		
Sample Collected:	02/03/1997	Findings:	77.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		

GEOCHECK VERSION 2.1
STATE DATABASE WELL INFORMATION

Sample Collected: 02/03/1997 Findings: 77.000 MG/L
Chemical: BICARBONATE ALKALINITY

Sample Collected: 02/03/1997 Findings: 126.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 02/03/1997 Findings: 18.000 MG/L
Chemical: CALCIUM

Sample Collected: 02/03/1997 Findings: 17.000 MG/L
Chemical: MAGNESIUM

Sample Collected: 02/03/1997 Findings: 62.000 MG/L
Chemical: SODIUM

Sample Collected: 02/03/1997 Findings: 3.000 MG/L
Chemical: POTASSIUM

Sample Collected: 02/03/1997 Findings: 73.000 MG/L
Chemical: CHLORIDE

Sample Collected: 02/03/1997 Findings: .160 MG/L
Chemical: FLUORIDE (TEMPERATURE DEPENDENT)

Sample Collected: 02/03/1997 Findings: 15.000 MG/L
Chemical: SILICA

Sample Collected: 02/03/1997 Findings: 720.000 UG/L
Chemical: IRON

Sample Collected: 02/03/1997 Findings: 48.000 UG/L
Chemical: MANGANESE

Sample Collected: 02/03/1997 Findings: 340.000 UG/L
Chemical: ALUMINUM

Sample Collected: 02/03/1997 Findings: 320.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 02/03/1997 Findings: 8.420
Chemical: LANGELIER INDEX @ 60 C

Sample Collected: 02/03/1997 Findings: 10.000 MG/L
Chemical: NITRATE (AS NO3)

Sample Collected: 02/03/1997 Findings: 14.300 NTU
Chemical: FIELD TURBIDITY

Sample Collected: 02/03/1997 Findings: .210 MG/L
Chemical: BROMIDE

Sample Collected: 02/03/1997 Findings: .280 UG/L
Chemical: PHOSPHATE

Sample Collected: 02/03/1997 Findings: 430.000 UG/L
Chemical: BORON

Sample Collected: 04/07/1997 Findings: 16.800 C
Chemical: SOURCE TEMPERATURE C

Sample Collected: 04/07/1997 Findings: 30.000 UNITS
Chemical: COLOR

Sample Collected: 04/07/1997 Findings: 290.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 04/07/1997 Findings: 7.300
Chemical: FIELD PH

Sample Collected: 04/07/1997 Findings: 7.950
Chemical: PH (LABORATORY)

Sample Collected: 04/07/1997 Findings: 58.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 04/07/1997 Findings: 58.000 MG/L
Chemical: BICARBONATE ALKALINITY

Sample Collected: 04/07/1997 Findings: 72.000 MG/L
Chemical: TOTAL HARDNESS (AS CACO3)

Sample Collected: 04/07/1997 Findings: 12.000 MG/L
Chemical: CALCIUM

Sample Collected: 04/07/1997 Findings: 8.900 MG/L
Chemical: MAGNESIUM

Sample Collected: 04/07/1997 Findings: 24.000 MG/L
Chemical: SODIUM

Sample Collected: 04/07/1997 Findings: 1.800 MG/L
Chemical: POTASSIUM

Sample Collected: 04/07/1997 Findings: 30.000 MG/L
Chemical: CHLORIDE

Sample Collected: 04/07/1997 Findings: 11.000 MG/L
Chemical: SILICA

Sample Collected: 04/07/1997 Findings: 380.000 UG/L
Chemical: IRON

Sample Collected: 04/07/1997 Findings: 150.000 MG/L
Chemical: TOTAL DISSOLVED SOLIDS

Sample Collected: 04/07/1997 Findings: 8.620
Chemical: LANGELIER INDEX @ 60 C

Sample Collected: 04/07/1997 Findings: 2.100 MG/L
Chemical: NITRATE (AS NO3)

Sample Collected: 04/07/1997 Findings: 14.500 NTU
Chemical: FIELD TURBIDITY

Sample Collected: 04/07/1997 Findings: .120 UG/L
Chemical: BORON

Sample Collected: 07/07/1997 Findings: 26.800 C
Chemical: SOURCE TEMPERATURE C

Sample Collected: 07/07/1997 Findings: 20.000 UNITS
Chemical: COLOR

Sample Collected: 07/07/1997 Findings: 250.000 UMHO
Chemical: SPECIFIC CONDUCTANCE

Sample Collected: 07/07/1997 Findings: 7.450
Chemical: FIELD PH

Sample Collected: 07/07/1997 Findings: 7.670
Chemical: PH (LABORATORY)

Sample Collected: 07/07/1997 Findings: 56.000 MG/L
Chemical: TOTAL ALKALINITY (AS CACO3)

Sample Collected: 07/07/1997 Findings: 56.000 MG/L
Chemical: BICARBONATE ALKALINITY

Sample Collected:	07/07/1997	Findings:	.220 UG/L
Chemical:	PHOSPHATE		
Sample Collected:	07/07/1997	Findings:	60.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	07/07/1997	Findings:	6.900 MG/L
Chemical:	CALCIUM		
Sample Collected:	07/07/1997	Findings:	8.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	07/07/1997	Findings:	23.000 MG/L
Chemical:	SODIUM		
Sample Collected:	07/07/1997	Findings:	1.800 MG/L
Chemical:	POTASSIUM		
Sample Collected:	07/07/1997	Findings:	31.000 MG/L
Chemical:	CHLORIDE		
Sample Collected:	07/07/1997	Findings:	15.000 MG/L
Chemical:	SILICA		
Sample Collected:	07/07/1997	Findings:	2.500 UG/L
Chemical:	ARSENIC		
Sample Collected:	07/07/1997	Findings:	280.000 UG/L
Chemical:	IRON		
Sample Collected:	07/07/1997	Findings:	120.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	07/07/1997	Findings:	8.720
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	07/07/1997	Findings:	7.920 NTU
Chemical:	FIELD TURBIDITY		
Sample Collected:	07/07/1997	Findings:	.130 MG/L
Chemical:	BROMIDE		
Sample Collected:	07/07/1997	Findings:	.021 UG/L
Chemical:	BORON		
Sample Collected:	10/06/1997	Findings:	20.600 C
Chemical:	SOURCE TEMPERATURE C		
Sample Collected:	10/06/1997	Findings:	15.000 UNITS
Chemical:	COLOR		
Sample Collected:	10/06/1997	Findings:	550.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	10/06/1997	Findings:	7.960
Chemical:	FIELD PH		
Sample Collected:	10/06/1997	Findings:	7.990
Chemical:	PH (LABORATORY)		
Sample Collected:	10/06/1997	Findings:	76.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	10/06/1997	Findings:	76.000 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	10/06/1997	Findings:	.160 MG/L
Chemical:	AMMONIA (NH3-N)		

Sample Collected:	10/06/1997	Findings:	106.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	10/06/1997	Findings:	9.500 MG/L
Chemical:	CALCIUM		
Sample Collected:	10/06/1997	Findings:	15.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	10/06/1997	Findings:	69.000 MG/L
Chemical:	SODIUM		
Sample Collected:	10/06/1997	Findings:	3.500 MG/L
Chemical:	POTASSIUM		
Sample Collected:	10/06/1997	Findings:	120.000 MG/L
Chemical:	CHLORIDE		
Sample Collected:	10/06/1997	Findings:	17.000 MG/L
Chemical:	SILICA		
Sample Collected:	10/06/1997	Findings:	470.000 UG/L
Chemical:	IRON		
Sample Collected:	10/06/1997	Findings:	307.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	10/06/1997	Findings:	8.590
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	10/06/1997	Findings:	7.300 NTU
Chemical:	FIELD TURBIDITY		
Sample Collected:	10/06/1997	Findings:	.360 MG/L
Chemical:	BROMIDE		
Sample Collected:	10/06/1997	Findings:	120.000 UG/L
Chemical:	BORON		

Well Within 1/4 - 1/2 Mile of Target Property (Western Quadrant)

Water System Information:

Prime Station Code:	02N/02E-21H01 M	User ID:	07C
FRDS Number Number:	0707548001	County:	Contra Costa
District Number:	37	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	380025.0 1214505.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	WELL 01		
System Number:	0707548		
System Name:	LODGE WATER SYSTEM		
Organization That Operates System:	Not Reported		
Pop Served:	Unknown, Small System	Connections:	Unknown, Small System
Area Served:	Not Reported		

GEOCHECK VERSION 2.1
PUBLIC WATER SUPPLY SYSTEM INFORMATION

Searched by Nearest PWS.

PWS SUMMARY:

PWS ID:	CA0707548	PWS Status:	Active	Distance from TP:	1 - 2 Miles
Date Initiated:	June / 1977	Date Deactivated:	Not Reported	Dir relative to TP:	East

PWS Name:
BRIDGEHEAD RENTALS SWS
MAURICE AND GENEVA LODGE
5540 HIGHWAY
OAKLEY, CA 94561

Addressee / Facility:
System Owner/Responsible Party
MAURICE AND GENEVA LODGE
2743 G STREET
ANTIOCH, CA 94509

Facility Latitude:	37 59 51	Facility Longitude:	121 42 41
City Served:	Not Reported		
Treatment Class:	Untreated	Population Served:	Under 101 Persons

PWS currently has or has had major violation(s): Yes

Violations information not reported.

EPA Waste Codes Addendum

Code	Description
D001	IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.
D002	A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.
D004	ARSENIC
D006	CADMIUM
D007	CHROMIUM
D008	LEAD
D009	MERCURY
D018	BENZENE
D019	CARBON TETRACHLORIDE
D035	METHYL ETHYL KETONE
F001	THE FOLLOWING SPENT HALOGENATED SOLVENTS USED IN DEGREASING: TETRACHLOROETHYLENE, TRICHLOROETHYLENE, METHYLENE CHLORIDE, 1,1,1-TRICHLOROETHANE, CARBON TETRACHLORIDE, AND CHLORINATED FLUOROCARBONS; ALL SPENT SOLVENT MIXTURES/BLENDS USED IN DEGREASING CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
F002	THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2-TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE LISTED IN F001, F004, OR F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
F003	THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS

EPA Waste Codes Addendum

Code	Description
	CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
F005	THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
F039	LEACHATE (LIQUIDS THAT HAVE PERCOLATED THROUGH LAND DISPOSED WASTES) RESULTING FROM THE DISPOSAL OF MORE THAN ONE RESTRICTED WASTE CLASSIFIED AS HAZARDOUS UNDER SUBPART D OF THIS PART. (LEACHATE RESULTING FROM THE DISPOSAL OF ONE OR MORE OF THE FOLLOWING EPA HAZARDOUS WASTES AND NO OTHER HAZARDOUS WASTES RETAINS ITS EPA HAZARDOUS WASTES NUMBER(S): F020, F021, F022, F026, F027, AND/OR F028).
U002	ACETONE (I)
U002	2-PROPANONE (I)
U075	DICHLORODIFLUOROMETHANE
U075	METHANE, DICHLORODIFLUORO-
U079	1,2-DICHLOROETHYLENE
U079	ETHENE, 1,2-DICHLORO-, (E)-
U080	METHANE, DICHLORO-
U080	METHYLENE CHLORIDE
U121	METHANE, TRICHLOROFLUORO-
U121	TRICHLOROMONOFLUOROMETHANE
U151	MERCURY
U154	METHANOL (I)
U154	METHYL ALCOHOL (I)
U211	CARBON TETRACHLORIDE
U211	METHANE, TETRACHLORO-
U220	BENZENE, METHYL-
U220	TOLUENE

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Elapsed ASTM days: Provides confirmation that this EDR report meets or exceeds the 90-day updating requirement of the ASTM standard.

FEDERAL ASTM RECORDS:

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System
Source: EPA
Telephone: 703-413-0223
CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 08/27/98
Date Made Active at EDR: 10/06/98
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 09/03/98
Elapsed ASTM days: 33
Date of Last EDR Contact: 12/02/98

ERNS: Emergency Response Notification System
Source: EPA/NTIS
Telephone: 202-260-2342
Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 06/30/98
Date Made Active at EDR: 07/20/98
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 07/14/98
Elapsed ASTM days: 6
Date of Last EDR Contact: 01/04/99

NPL: National Priority List
Source: EPA
Telephone: 703-603-8852
National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC).

Date of Government Version: 10/08/98
Date Made Active at EDR: 01/08/99
Database Release Frequency: Semi-Annually
Date of Data Arrival at EDR: 12/29/98
Elapsed ASTM days: 10
Date of Last EDR Contact: 12/28/98

RCRIS: Resource Conservation and Recovery Information System
Source: EPA/NTIS
Telephone: 800-424-9346
Resource Conservation and Recovery Information System. RCRIS includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA).

Date of Government Version: 07/01/98
Date Made Active at EDR: 10/06/98
Database Release Frequency: Semi-Annually
Date of Data Arrival at EDR: 08/27/98
Elapsed ASTM days: 40
Date of Last EDR Contact: 12/02/98

CORRACTS: Corrective Action Report
Source: EPA
Telephone: 800-424-9346
CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 06/30/98
Date Made Active at EDR: 12/24/98
Database Release Frequency: Semi-Annually
Date of Data Arrival at EDR: 10/05/98
Elapsed ASTM days: 80
Date of Last EDR Contact: 12/22/98

EPA Waste Codes Addendum

Code	Description

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

FEDERAL NON-ASTM RECORDS:

BRS: Biennial Reporting System
Source: EPA/NTIS
Telephone: 800-424-9346

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/95
Database Release Frequency: Biennially
Date of Last EDR Contact: 12/21/98
Date of Next Scheduled EDR Contact: 03/22/99

CONSENT: Superfund (CERCLA) Consent Decrees
Source: EPA Regional Offices
Telephone: Varies

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: Varies
Database Release Frequency: Varies
Date of Last EDR Contact: Varies
Date of Next Scheduled EDR Contact: N/A

FINDS: Facility Index System
Source: EPA/NTIS
Telephone: 703-908-2493

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 09/30/97
Database Release Frequency: Quarterly
Date of Last EDR Contact: 12/23/98
Date of Next Scheduled EDR Contact: 03/29/99

HMIRS: Hazardous Materials Information Reporting System
Source: U.S. Department of Transportation
Telephone: 202-366-4526

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 12/31/97
Database Release Frequency: Annually
Date of Last EDR Contact: 10/26/98
Date of Next Scheduled EDR Contact: 01/25/99

MLTS: Material Licensing Tracking System
Source: Nuclear Regulatory Commission
Telephone: 301-415-7169

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 07/28/98
Database Release Frequency: Quarterly
Date of Last EDR Contact: 12/01/98
Date of Next Scheduled EDR Contact: 03/01/99

NPL LIENS: Federal Superfund Liens
Source: EPA
Telephone: 205-564-4267

Federal Superfund Liens. Under the authority granted the USEPA by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner receives notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/91
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 11/23/98
Date of Next Scheduled EDR Contact: 02/22/99

PADS: PCB Activity Database System
Source: EPA
Telephone: 202-260-3936
PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 09/22/97	Date of Last EDR Contact: 12/03/98
Database Release Frequency: Semi-Annually	Date of Next Scheduled EDR Contact: 02/15/99

RAATS: RCRA Administrative Action Tracking System
Source: EPA
Telephone: 202-564-4104
RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/95	Date of Last EDR Contact: 12/15/98
Database Release Frequency: No Update Planned	Date of Next Scheduled EDR Contact: 03/15/99

ROD: Records Of Decision
Source: NTIS
Telephone: 703-416-0223
Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 03/31/95	Date of Last EDR Contact: 10/09/98
Database Release Frequency: Annually	Date of Next Scheduled EDR Contact: 01/18/99

TRIS: Toxic Chemical Release Inventory System
Source: EPA/NTIS
Telephone: 202-260-1531
Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/95	Date of Last EDR Contact: 12/28/98
Database Release Frequency: Annually	Date of Next Scheduled EDR Contact: 03/29/99

TSCA: Toxic Substances Control Act
Source: EPA/NTIS
Telephone: 202-260-1444
Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site. USEPA has no current plan to update and/or re-issue this database.

Date of Government Version: 12/31/94	Date of Last EDR Contact: 10/26/98
Database Release Frequency: Annually	Date of Next Scheduled EDR Contact: 01/25/99

STATE OF CALIFORNIA ASTM RECORDS:

BEP: Bond Expenditure Plan
Source: Department of Health Services
Telephone: 916-255-2118

Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

Date of Government Version: 01/01/89
Date Made Active at EDR: 08/02/94
Database Release Frequency: No Update Planned
Date of Data Arrival at EDR: 07/27/94
Elapsed ASTM days: 6
Date of Last EDR Contact: 05/31/94

CAL-SITES (AWP): Annual Workplan
Source: California Environmental Protection Agency
Telephone: 916-323-3400

Known Hazardous Waste Sites. California DTSC's Annual Workplan (AWP), formerly BEP, identifies known hazardous substance sites targeted for cleanup.

Date of Government Version: 11/04/97
Date Made Active at EDR: 12/20/97
Database Release Frequency: Annually
Date of Data Arrival at EDR: 11/21/97
Elapsed ASTM days: 29
Date of Last EDR Contact: 11/03/98

CAL-SITES (ASPIS): Calsites
Source: Department of Toxic Substance Control
Telephone: 916-323-3400

The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database.

Date of Government Version: 07/23/98
Date Made Active at EDR: 09/23/98
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 08/24/98
Elapsed ASTM days: 30
Date of Last EDR Contact: 12/08/98

CHMIRS: California Hazardous Material Incident Report System
Source: Office of Emergency Services
Telephone: 916-464-3277

California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

Date of Government Version: 12/31/94
Date Made Active at EDR: 04/24/95
Database Release Frequency: No Update Planned
Date of Data Arrival at EDR: 03/13/95
Elapsed ASTM days: 42
Date of Last EDR Contact: 12/02/98

CORTESE: Cortese
Source: CAL EPA/Office of Emergency Information
Telephone: 916-327-1848

The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites).

Date of Government Version: 04/01/98
Date Made Active at EDR: 09/23/98
Database Release Frequency: Annually
Date of Data Arrival at EDR: 08/26/98
Elapsed ASTM days: 28
Date of Last EDR Contact: 11/06/98

LUST: Leaking Underground Storage Tank Information System
Source: State Water Resources Control Board
Telephone: 916-445-6532

Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 08/01/98
Date Made Active at EDR: 01/13/99
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 12/08/98
Elapsed ASTM days: 36
Date of Last EDR Contact: 11/12/98

NOTIFY 65: Proposition 65
Source: State Water Resources Control Board
Telephone: 916-657-0696
Proposition 65 Notification Records. NOTIFY 65 contains facility notifications about any release which could impact drinking water and thereby expose the public to a potential health risk.

Date of Government Version: 10/21/93
Date Made Active at EDR: 11/19/93
Database Release Frequency: No Update Planned
Date of Data Arrival at EDR: 11/01/93
Elapsed ASTM days: 18
Date of Last EDR Contact: 10/26/98

SWF/LF (SWIS): Solid Waste Information System
Source: Integrated Waste Management Board
Telephone: 916-255-4035
Active, Closed and Inactive Landfills. SWF/LF records typically contain an inventory of solid waste disposal facilities or landfills. These may be active or inactive facilities or open dumps that failed to meet RCRA Section 2004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 09/21/98
Date Made Active at EDR: 01/13/99
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 12/10/98
Elapsed ASTM days: 34
Date of Last EDR Contact: 12/21/98

TOXIC PITS: Toxic Pits
Source: State Water Resources Control Board
Telephone: 916-227-4364
Toxic PITS Cleanup Act Sites. TOXIC PITS identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

Date of Government Version: 07/01/95
Date Made Active at EDR: 09/26/95
Database Release Frequency: No Update Planned
Date of Data Arrival at EDR: 08/30/95
Elapsed ASTM days: 27
Date of Last EDR Contact: 11/09/98

CA UST:

UST: Hazardous Substance Storage Container Database
Source: State Water Resources Control Board
Telephone: 916-227-4408
The Hazardous Substance Storage Container Database is a historical listing of UST sites. Refer to local/county source for current data.

Date of Government Version: 10/15/90
Date Made Active at EDR: 02/12/91
Database Release Frequency: No Update Planned
Date of Data Arrival at EDR: 01/25/91
Elapsed ASTM days: 18
Date of Last EDR Contact: 10/19/98

FID: Facility Inventory Database
Source: California Environmental Protection Agency
Telephone: 916-445-6532
The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board. Refer to local/county source for current data.

Date of Government Version: 10/31/94
Date Made Active at EDR: 09/29/95
Database Release Frequency: No Update Planned
Date of Data Arrival at EDR: 09/05/95
Elapsed ASTM days: 24
Date of Last EDR Contact: 12/28/98

WMUDS/SWAT: Waste Management Unit Database
Source: State Water Resources Control Board
Telephone: 916-227-4448
Waste Management Unit Database System. WMUDS is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units. WMUDS is composed of the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, SWAT Program Information, SWAT Report Summary Information, SWAT Report Summary Data, Chapter 15 (formerly Subchapter 15) Information, Chapter 15 Monitoring Parameters, TPCA Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.

Date of Government Version: 10/05/98
Date Made Active at EDR: 01/13/99
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 12/08/98
Elapsed ASTM days: 36
Date of Last EDR Contact: 12/14/98

STATE OF CALIFORNIA NON-ASTM RECORDS:

AST: Aboveground Petroleum Storage Tank Facilities
Source: State Water Resources Control Board
Telephone: 916-227-4382
Registered Aboveground Storage Tanks.

Date of Government Version: 09/16/97
Database Release Frequency: Quarterly
Date of Last EDR Contact: 11/09/98
Date of Next Scheduled EDR Contact: 02/08/99

HAZMAT: Hazmat Facilities
Source: City of San Jose Fire Department
Telephone: 408-277-4659

Date of Government Version: 04/17/98
Database Release Frequency: Quarterly
Date of Last EDR Contact: 11/23/98
Date of Next Scheduled EDR Contact: 02/22/99

HAZNET: Hazardous Waste Information System
Source: California Environmental Protection Agency
Telephone: 916-324-1781
Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method.

Date of Government Version: 12/31/95
Database Release Frequency: Annually
Date of Last EDR Contact: 12/03/98
Date of Next Scheduled EDR Contact: 01/18/99

SOUTH BAY: South Bay Site Management System
Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
Groundwater pollution cases in the Santa Clara Valley where the regulatory lead is the San Francisco Bay Regional Water Quality Control Board.

Date of Government Version: 09/01/96
Database Release Frequency: Annually
Date of Last EDR Contact: 09/14/98
Date of Next Scheduled EDR Contact: 12/14/98

WDS: Waste Discharge System
Source: State Water Resources Control Board
Telephone: 916-657-1571
Sites which have been issued waste discharge requirements.

Date of Government Version: 09/01/98
Database Release Frequency: Quarterly
Date of Last EDR Contact: 11/23/98
Date of Next Scheduled EDR Contact: 02/22/99

CALIFORNIA COUNTY RECORDS

ALAMEDA COUNTY:

Underground Tanks
Source: Alameda County Environmental Health Services
Telephone: 510-567-6700

Date of Government Version: 04/01/98
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 11/04/98
Date of Next Scheduled EDR Contact: 02/01/99

Local Oversight Program Listing of UGT Cleanup Sites
Source: Alameda County Environmental Health Services
Telephone: 510-567-6700

Date of Government Version: 10/01/97
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 11/04/98
Date of Next Scheduled EDR Contact: 02/01/99

CONTRA COSTA COUNTY:

SL: Site List
Source: Contra Costa Health Services Department
Telephone: 925-646-2286
List includes sites from the underground tank, hazardous waste generator and business plan/2185 programs.

Date of Government Version: 05/21/98
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 11/09/98
Date of Next Scheduled EDR Contact: 02/08/99

KERN COUNTY:

UST: Sites & Tanks Listing
Source: Kern County Environment Health Services Department
Telephone: 805-862-8700
Kern County Sites and Tanks Listing.

Date of Government Version: 04/21/98
Database Release Frequency: Quarterly
Date of Last EDR Contact: 12/07/98
Date of Next Scheduled EDR Contact: 03/08/99

LOS ANGELES COUNTY:

HMS: Street Number List
Source: Department of Public Works
Telephone: 626-458-3517
Industrial Waste and Underground Storage Tank Sites.

Date of Government Version: 06/30/98
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 01/11/99
Date of Next Scheduled EDR Contact: 04/12/99

SWF/LF: List of Solid Waste Facilities
Source: La County Department of Public Works
Telephone: 818-458-5185

Date of Government Version: 01/31/96
Database Release Frequency: Annually
Date of Last EDR Contact: 11/30/98
Date of Next Scheduled EDR Contact: 02/22/99

Site Mitigation List
Source: Community Health Services
Telephone: 213-890-7806
Industrial sites that have had some sort of spill or complaint.

Date of Government Version: 01/20/98
Database Release Frequency: Quarterly
Date of Last EDR Contact: 11/23/98
Date of Next Scheduled EDR Contact: 02/22/99

MARIN COUNTY:

UST Sites
Source: Public Works Department Waste Management
Telephone: 415-499-6647
Currently permitted USTs in Marin County.

Date of Government Version: 12/01/97
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 11/09/98
Date of Next Scheduled EDR Contact: 02/08/99

NAPA COUNTY:

LUST: Sites With Reported Contamination
Source: Napa County Department of Environmental Management
Telephone: 707-253-4269

Date of Government Version: 10/27/97
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 12/21/98
Date of Next Scheduled EDR Contact: 03/22/99

UST: Closed and Operating Underground Storage Tank Sites
Source: Napa County Department of Environmental Management
Telephone: 707-253-4269

Date of Government Version: 02/17/98
Database Release Frequency: Annually
Date of Last EDR Contact: 12/21/98
Date of Next Scheduled EDR Contact: 03/22/99

ORANGE COUNTY:

List of Industrial Site Cleanups
Source: Health Care Agency
Telephone: 714-834-3446
Petroleum and non-petroleum spills.

Date of Government Version: 07/14/98
Database Release Frequency: Quarterly
Date of Last EDR Contact: 12/14/98
Date of Next Scheduled EDR Contact: 03/15/99

LUST: List of Underground Storage Tank Cleanups
Source: Health Care Agency
Telephone: 714-834-3446
Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 07/02/98
Database Release Frequency: Quarterly
Date of Last EDR Contact: 12/14/98
Date of Next Scheduled EDR Contact: 03/15/99

UST: List of Underground Storage Tank Facilities
Source: Health Care Agency
Telephone: 714-834-3446
Orange County Underground Storage Tank Facilities (UST).

Date of Government Version: 02/24/98
Database Release Frequency: Quarterly
Date of Last EDR Contact: 12/14/98
Date of Next Scheduled EDR Contact: 03/15/99

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

PLACER COUNTY:

MS: Master List of Facilities
Source: Placer County Health and Human Services
Telephone: 530-889-7335
List includes aboveground tanks, underground tanks and cleanup sites.

Date of Government Version: 10/21/98	Date of Last EDR Contact: 12/28/98
Database Release Frequency: Semi-Annually	Date of Next Scheduled EDR Contact: 03/29/99

RIVERSIDE COUNTY:

LUST: Listing of Underground Tank Cleanup Sites
Source: Department of Public Health
Telephone: 909-358-5055
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 10/07/98	Date of Last EDR Contact: 10/26/98
Database Release Frequency: Quarterly	Date of Next Scheduled EDR Contact: 01/25/99

UST: Tank List
Source: Health Services Agency
Telephone: 909-358-5055

Date of Government Version: 01/14/98	Date of Last EDR Contact: 10/26/98
Database Release Frequency: Quarterly	Date of Next Scheduled EDR Contact: 01/25/99

SACRAMENTO COUNTY:

Toxisite List
Source: Sacramento County Environmental Management
Telephone: 916-875-8450

Date of Government Version: 02/02/98	Date of Last EDR Contact: 11/16/98
Database Release Frequency: Quarterly	Date of Next Scheduled EDR Contact: 02/08/99

ML: Regulatory Compliance Master List
Source: Sacramento County Environmental Management
Telephone: 916-875-8450
Any business that has hazardous materials on site - hazardous material storage sites, underground storage tanks, waste generators.

Date of Government Version: 01/06/98	Date of Last EDR Contact: 11/16/98
Database Release Frequency: Quarterly	Date of Next Scheduled EDR Contact: 02/08/99

SAN BERNARDINO COUNTY:

DEHS Permit System Print-Out By Location
Source: San Bernardino County Fire Department Hazardous Materials Division
Telephone: 909-387-3041
This listing includes underground storage tanks, medical waste handlers/generators, hazardous materials handlers, hazardous waste generators, and waste oil generators/handlers.

Date of Government Version: 10/01/98	Date of Last EDR Contact: 12/14/98
Database Release Frequency: Quarterly	Date of Next Scheduled EDR Contact: 03/15/99

SAN DIEGO COUNTY:

SWF/LF: Solid Waste Facilities
Source: Department of Health Services
Telephone: 619-338-2209
San Diego County Solid Waste Facilities.

Date of Government Version: 07/01/98
Database Release Frequency: Annually
Date of Last EDR Contact: 12/02/98
Date of Next Scheduled EDR Contact: 03/01/99

HMMD: Hazardous Materials Management Division Database
Source: Hazardous Materials Management Division
Telephone: 619-338-2268
The database includes: HE58 - This report contains the business name, site address, business phone number, establishment 'H' permit number, type of permit, and the business status. HE17 - In addition to providing the same information provided in the HE58 listing, HE17 provides inspection dates, violations received by the establishment, hazardous waste generated, the quantity, method of storage, treatment/disposal of waste and the hauler, and information on underground storage tanks. Unauthorized Release List - Includes a summary of environmental contamination cases in San Diego County (underground tank cases, non-tank cases, groundwater contamination, and soil contamination are included.)

Date of Government Version: 07/20/98
Database Release Frequency: Quarterly
Date of Last EDR Contact: 01/04/99
Date of Next Scheduled EDR Contact: 04/12/99

SAN FRANCISCO COUNTY:

LUST: Local Oversite Facilities
Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920

Date of Government Version: 08/26/98
Database Release Frequency: Quarterly
Date of Last EDR Contact: 11/16/98
Date of Next Scheduled EDR Contact: 02/15/99

Underground Storage Tank Information
Source: Department of Public Health
Telephone: 415-252-3920

Date of Government Version: 03/19/98
Database Release Frequency: Quarterly
Date of Last EDR Contact: 11/16/98
Date of Next Scheduled EDR Contact: 02/15/99

SAN MATEO COUNTY:

Business Inventory
Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
List includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

Date of Government Version: 04/01/98
Database Release Frequency: Annually
Date of Last EDR Contact: 11/16/98
Date of Next Scheduled EDR Contact: 02/15/99

LUST: Fuel Leak List
Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921

Date of Government Version: 10/02/98
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 01/04/99
Date of Next Scheduled EDR Contact: 01/04/99

SANTA CLARA COUNTY:

LUST: Fuel Leak Site Activity Report
Source: Santa Clara Valley Water District
Telephone: 408-927-0710

Date of Government Version: 09/01/98	Date of Last EDR Contact: 01/08/99
Database Release Frequency: Quarterly	Date of Next Scheduled EDR Contact: 04/05/99

SOLANO COUNTY:

LUST: Leaking Undergroung Storage Tanks
Source: Solano County Department of Environmental Management
Telephone: 707-421-6770

Date of Government Version: 08/17/98	Date of Last EDR Contact: 12/01/98
Database Release Frequency: Quarterly	Date of Next Scheduled EDR Contact: 02/22/99

UST: Underground Storage Tanks
Source: Solano County Department of Environmental Management
Telephone: 707-421-6770

Date of Government Version: 04/16/98	Date of Last EDR Contact: 12/01/98
Database Release Frequency: Quarterly	Date of Next Scheduled EDR Contact: 02/22/99

SONOMA COUNTY:

LUST Sites
Source: Department of Health Services
Telephone: 707-525-6565

Date of Government Version: 10/26/98	Date of Last EDR Contact: 10/05/98
Database Release Frequency: Quarterly	Date of Next Scheduled EDR Contact: 01/05/99

SUTTER COUNTY:

UST: Underground Storage Tanks
Source: Sutter County Department of Agriculture
Telephone: 530-741-7504

Date of Government Version: 09/18/97	Date of Last EDR Contact: 01/11/99
Database Release Frequency: Semi-Annually	Date of Next Scheduled EDR Contact: 04/12/99

VENTURA COUNTY:

BWT: Business Plan, Hazardous Waste Producers, and Operating Underground Tanks
Source: Ventura County Environmental Health Division
Telephone: 805-654-2813
The BWT list indicates by site address whether the Environmental Health Division has Business Plan (B), Waste Producer (W), and/or Underground Tank (T) information.

Date of Government Version: 09/24/98	Date of Last EDR Contact: 12/21/98
Database Release Frequency: Quarterly	Date of Next Scheduled EDR Contact: 03/22/99

LUST: Listing of Underground Tank Cleanup Sites
Source: Environmental Health Division
Telephone: 805-654-2813
Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 09/30/98
Database Release Frequency: Quarterly
Date of Last EDR Contact: 12/21/98
Date of Next Scheduled EDR Contact: 03/22/99

UST: Underground Tank Closed Sites List
Source: Environmental Health Division
Telephone: 805-654-2813
Ventura County Operating Underground Storage Tank Sites (UST)/Underground Tank Closed Sites List.

Date of Government Version: 06/29/98
Database Release Frequency: Quarterly
Date of Last EDR Contact: 12/21/98
Date of Next Scheduled EDR Contact: 03/22/99

SWF/LF: Inventory of Illegal Abandoned and Inactive Sites
Source: Environmental Health Division
Telephone: 805-654-2813
Ventura County Inventory of Closed, Illegal Abandoned, and Inactive Sites.

Date of Government Version: 06/01/97
Database Release Frequency: Annually
Date of Last EDR Contact: 11/30/98
Date of Next Scheduled EDR Contact: 03/01/99

California Regional Water Quality Control Board (RWQCB) LUST Records

LUST REG 1: Active Toxic Site Investigation
Source: California Regional Water Quality Control Board North Coast (1)
Telephone: 707-576-2220

Date of Government Version: 06/30/98
Database Release Frequency: Quarterly
Date of Last EDR Contact: 11/30/98
Date of Next Scheduled EDR Contact: 03/01/99

LUST REG 2: Fuel Leak List
Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457

Date of Government Version: 05/20/98
Database Release Frequency: Quarterly
Date of Last EDR Contact: 10/26/98
Date of Next Scheduled EDR Contact: 01/18/99

LUST REG 3: LUSTIS Database
Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147

Date of Government Version: 08/01/98
Database Release Frequency: Quarterly
Date of Last EDR Contact: 11/24/98
Date of Next Scheduled EDR Contact: 02/22/99

LUST REG 4: Underground Storage Tank Leak List
Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-266-7544

Date of Government Version: 08/13/98
Database Release Frequency: Quarterly
Date of Last EDR Contact: 01/05/99
Date of Next Scheduled EDR Contact: 04/05/99

LUST REG 5: Leaking Underground Storage Tank Database
Source: California Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-255-3125

Date of Government Version: 07/22/98
Database Release Frequency: Quarterly
Date of Last EDR Contact: 01/11/99
Date of Next Scheduled EDR Contact: 04/12/99

LUST REG 6L: Leaking Underground Storage Tank Case Listing
Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 916-542-5424

Date of Government Version: 07/14/98
Database Release Frequency: Quarterly
Date of Last EDR Contact: 10/14/98
Date of Next Scheduled EDR Contact: 01/11/99

LUST REG 6V: Leaking Underground Storage Tank Case Listing
Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-346-7491

Date of Government Version: 09/16/98
Database Release Frequency: Quarterly
Date of Last EDR Contact: 12/17/98
Date of Next Scheduled EDR Contact: 03/15/99

LUST REG 7: Leaking Underground Storage Tank Case Listing
Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-346-7491

Date of Government Version: 08/01/98
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 11/30/98
Date of Next Scheduled EDR Contact: 03/01/99

LUST REG 8: (LUSTIS) Leaking Underground Storage Tanks
Source: California Regional Water Quality Control Board Santa Ana Region (8)
Telephone: 909-782-4498

Date of Government Version: 07/13/98
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 01/13/99
Date of Next Scheduled EDR Contact: 04/12/99

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

LUST REG 9: Leaking Underground Storage Tank Report
Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 619-467-2952

Date of Government Version: 06/25/98
Database Release Frequency: Quarterly

Date of Last EDR Contact: 07/15/98
Date of Next Scheduled EDR Contact: 11/03/98

California Regional Water Quality Control Board (RWQCB) SLIC Records

SLIC REG 1: Active Toxic Site Investigations
Source: California Regional Water Quality Control Board, North Coast Region (1)
Telephone: 707-576-2220

Date of Government Version: 06/30/98
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 11/30/98
Date of Next Scheduled EDR Contact: 03/01/99

SLIC REG 2: North and South Bay Slic Report
Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
Any contaminated site that impacts groundwater or has the potential to impact groundwater.

Date of Government Version: 05/20/98
Database Release Frequency: Quarterly
Date of Last EDR Contact: 10/26/98
Date of Next Scheduled EDR Contact: 01/18/99

SLIC REG 3: SLIC Data
Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147
Any contaminated site that impacts groundwater or has the potential to impact groundwater.

Date of Government Version: 08/01/98
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 11/24/98
Date of Next Scheduled EDR Contact: 02/22/99

SLIC REG 4: SLIC Sites
Source: Region Water Quality Control Board Los Angeles Region (4)
Telephone: 213-266-7544
Any contaminated site that impacts groundwater or has the potential to impact groundwater.

Date of Government Version: 07/01/98
Database Release Frequency: Quarterly
Date of Last EDR Contact: 01/11/99
Date of Next Scheduled EDR Contact: 04/05/99

SLIC REG 5: SLIC List
Source: Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-855-3075
Unregulated sites that impact groundwater or have the potential to impact groundwater.

Date of Government Version: 10/01/98
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 01/11/99
Date of Next Scheduled EDR Contact: 04/12/98

SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: Regional Water Quality Control Board, Victorville Branch
Telephone: 619-241-6583

Date of Government Version: 09/23/97
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 01/11/99
Date of Next Scheduled EDR Contact: 04/12/99

SLIC REG 8: SLIC List
Source: California Region Water Quality Control Board Santa Ana Region (8)
Telephone: 909-782-3298

Date of Government Version: 10/31/97
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 10/13/98
Date of Next Scheduled EDR Contact: 01/11/99

SLIC REG 9: WDS NURD List
Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 619-467-2980

Date of Government Version: 11/21/96
Database Release Frequency: Annually
Date of Last EDR Contact: 12/11/98
Date of Next Scheduled EDR Contact: 03/08/99

Historical and Other Database(s)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

Former Manufactured Gas (Coal Gas) Sites: The existence and location of Coal Gas sites is provided exclusively to EDR by Real Property Scan, Inc. ©Copyright 1993 Real Property Scan, Inc. For a technical description of the types of hazards which may be found at such sites, contact your EDR customer service representative.

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The information contained in this report has predominantly been obtained from publicly available sources produced by entities other than Real Property Scan. While reasonable steps have been taken to insure the accuracy of this report, Real Property Scan does not guarantee the accuracy of this report. Any liability on the part of Real Property Scan is strictly limited to a refund of the amount paid. No claim is made for the actual existence of toxins at any site. This report does not constitute a legal opinion.

DELISTED NPL: NPL Deletions
Source: EPA
Telephone: 703-603-8769
The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 10/08/98
Date Made Active at EDR: 01/08/99
Database Release Frequency: Semi-Annually
Date of Data Arrival at EDR: 12/29/98
Elapsed ASTM days: 10
Date of Last EDR Contact: 12/28/98

NFRAP: No Further Remedial Action Planned
Source: EPA
Telephone: 703-413-0223
As of February 1995, CERCLIS sites designated "No Further Remedial Action Planned" (NFRAP) have been removed from CERCLIS. NFRAP sites may be sites where, following an initial investigation, no contamination was found, contamination was removed quickly without the need for the site to be placed on the NPL, or the contamination was not serious enough to require Federal Superfund action or NPL consideration. EPA has removed approximately 25,000 NFRAP sites to lift the unintended barriers to the redevelopment of these properties and has archived them as historical records so EPA does not needlessly repeat the investigations in the future. This policy change is part of the EPA's Brownfields Redevelopment Program to help cities, states, private investors and affected citizens to promote economic redevelopment of unproductive urban sites.

Date of Government Version: 08/27/98
Date Made Active at EDR: 10/03/98
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 09/03/98
Elapsed ASTM days: 30
Date of Last EDR Contact: 12/02/98

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-260-2805
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-260-2805
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SWDIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Area Radon Information: The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones: Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

Oil/Gas Pipelines/Electrical Transmission Lines: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines and electrical transmission lines.

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

USGS Water Wells: In November 1971 the United States Geological Survey (USGS) implemented a national water resource information tracking system. This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on more than 900,000 wells, springs, and other sources of groundwater.

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1996 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in March 1997 from the U.S. Fish and Wildlife Service.

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

Water Dams: National Inventory of Dams
Source: Federal Emergency Management Agency
Telephone: 202-646-2801
National computer database of more than 74,000 dams maintained by the Federal Emergency Management Agency.

California Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary fault lines, prepared in 1975 by the United State Geological Survey. Additional information (also from 1975) regarding activity at specific fault lines comes from California's Preliminary Fault Activity Map prepared by the California Division of Mines and Geology.

California Drinking Water Quality Database
Source: Department of Health Services
Telephone: 916-324-2319
The database includes all drinking water compliance and special studies monitoring for the state of California since 1984. It consists of over 3,200,000 individual analyses along with well and water system information.

California Oil and Gas Well Locations for District 2 and 6
Source: Department of Conservation
Telephone: 916-323-1779

Appendix N

Project Site Phase I
Environmental Site Assessment

PHASE I ENVIRONMENTAL SITE ASSESSMENT PROPOSED RETAIL #94098 BRIDGEHEAD ROAD AND MAIN STREET (HIGHWAY 4) OAKLEY, CALIFORNIA

February 23, 2006

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A Report Prepared for:

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PACLAND, Inc.
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Roseville, CA 95661

PHASE I ENVIRONMENTAL SITE ASSESSMENT PROPOSED RETAIL #94098 BRIDGEHEAD ROAD AND MAIN STREET (HIGHWAY 4) OAKLEY, CALIFORNIA

Kleinfelder Job No: 61102.PH1
February 23, 2006

for
Ryan Brosius
Staff Environmental Scientist

For Don D'Amico
Environmental Group Manager

James A. Lehrman, RG, CHG, REA
Environmental Group Manager

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Important Information About Your Geoenvironmental Report

Geoenvironmental studies are commissioned to gain information about environmental conditions on and beneath the surface of a site. The more comprehensive the study, the more reliable the assessment is likely to be. But remember: Any such assessment is to a greater or lesser extent based on professional opinions about conditions that cannot be seen or tested. Accordingly, no matter how many data are developed, risks created by unanticipated conditions will always remain. *Have realistic expectations.* Work with your geoenvironmental consultant to manage known and unknown risks. Part of that process should already have been accomplished, through the risk allocation provisions you and your geoenvironmental professional discussed and included in your contract's general terms and conditions. This document is intended to explain some of the concepts that may be included in your agreement, and to pass along information and suggestions to help you manage your risk.

Beware of Change; Keep Your Geoenvironmental Professional Advised

The design of a geoenvironmental study considers a variety of factors that are subject to change. Changes can undermine the applicability of a report's findings, conclusions, and recommendations. *Advise your geoenvironmental professional about any changes you become aware of.* Geoenvironmental professionals cannot accept responsibility or liability for problems that occur because a report fails to consider conditions that did not exist when the study was designed. Ask your geoenvironmental professional about the types of changes you should be particularly alert to. Some of the most common include:

- modification of the proposed development or ownership group,
- sale or other property transfer,
- replacement of or additions to the financing entity,
- amendment of existing regulations or introduction of new ones, or
- changes in the use or condition of adjacent property.

Should you become aware of any change, *do not rely on a geoenvironmental report.* Advise your geoenvironmental professional immediately; follow the professional's advice.

Recognize the Impact of Time

A geoenvironmental professional's findings, recommendations, and conclusions cannot remain valid indefinitely. The more time that passes, the more likely it is that important latent changes will occur. *Do not rely on a geoenvironmental report if too much time has elapsed since it was completed.* Ask your environmental professional to define "too much time." In the case of Phase I Environmental Site Assessments (ESAs), for example, more than 180 days after submission is generally considered "too much."

Prepare To Deal with Unanticipated Conditions

The findings, recommendations, and conclusions of a Phase I ESA report typically are based on a review of historical information, interviews, a site "walkover," and other forms of noninvasive research. When site subsurface conditions are not sampled in any way, the risk of unanticipated conditions is higher than it would otherwise be.

While borings, installation of monitoring wells, and similar invasive test methods can help reduce the risk of unanticipated conditions, *do not overvalue the effectiveness of testing.* Testing provides information about actual conditions only at the precise locations where samples are taken, and only when they are taken. Your geoenvironmental professional has applied that specific information to develop a general opinion about environmental conditions. *Actual conditions in areas not sampled may differ (sometimes sharply) from those predicted in a report.* For example, a site may contain an unregistered underground storage tank that shows no surface trace of its existence. *Even conditions in areas that were tested can change,* sometimes suddenly, due to any number of events, not the least of which include occurrences at adjacent sites. Recognize, too, that *even some conditions in tested areas may go undiscovered,* because the tests or analytical methods used were designed to detect only those conditions assumed to exist.

Manage your risks by retaining your geoenvironmental professional to work with you as the project proceeds. Establish a contingency fund or other means to enable your geoenvironmental professional to respond rapidly, in order to limit the impact of unforeseen conditions. And to help prevent any misunderstanding, identify those empowered to authorize changes and the administrative procedures that should be followed.

Do Not Permit Any Other Party To Rely on the Report

Geoenvironmental professionals design their studies and prepare their reports to meet the specific needs of the clients who retain them, in light of the risk management methods that the client and geoenvironmental professional agree to, and the statutory, regulatory, or other requirements that apply. The study designed for a developer may differ sharply from one designed for a lender, insurer, public agency...or even another developer. *Unless the report specifically states otherwise, it was developed for you and only you.* Do not unilaterally permit any other party to rely on it. The report and the study underlying it may not be adequate for another party's needs, and you could be held liable for shortcomings your geoenvironmental professional was powerless to prevent or anticipate. Inform your geoenvironmental professional when you know or expect that someone else—a third-party—will want to use or rely on the report. *Do not permit third-party use or reliance until you first confer with the geoenvironmental professional who prepared the report.* Additional testing, analysis, or study may be required and, in any event, appropriate terms and conditions should be agreed to so both you and your geoenvironmental professional are protected from third-party risks. *Any party who relies on a geoenvironmental report without the express written permission of the professional who prepared it and the client for whom it was prepared may be solely liable for any problems that arise.*

Avoid Misinterpretation of the Report

Design professionals and other parties may want to rely on the report in developing plans and specifications. They need to be advised, in writing, that their needs may not have been considered when the study's scope was developed, and, even if their needs were considered, they might misinterpret geoenvironmental findings, conclusions, and recommendations. *Commission your geoenvironmental professional to explain pertinent elements of the report to others who are permitted to rely on it, and to review any plans, specifications or other instruments of professional service that incorporate any of the report's findings, conclusions, or recommendations.* Your geoenvironmental professional has the best understanding of the issues involved, including the fundamental assumptions that underpinned the study's scope.

Give Contractors Access to the Report

Reduce the risk of delays, claims, and disputes by giving contractors access to the full report, *providing that it is accompanied by a letter of transmittal that can protect you* by making it unquestionably clear that: 1) the study was not conducted and the report was not prepared for purposes of bid development, and 2) the findings, conclusions, and recommendations included in the report are based on a variety of opinions, inferences, and assumptions and are subject to interpretation. Use the letter to also advise contractors to consult with your geoenvironmental professional to obtain clarifications, interpretations, and guidance (a fee may be required for this service), and that—in any event—they should conduct additional studies to obtain the specific type and extent of information each prefers for preparing a bid or cost estimate. Providing access to the full report, with the appropriate caveats, helps prevent formation of adversarial attitudes and claims of concealed or differing conditions. If a contractor elects to ignore the warnings and advice in the letter of transmittal, it would do so at its own risk. Your geoenvironmental professional should be able to help you prepare an effective letter.

Do Not Separate Documentation from the Report

Geoenvironmental reports often include supplemental documentation, such as maps and copies of regulatory files, permits, registrations, citations, and correspondence with regulatory agencies. If subsurface explorations were performed, the report may contain final boring logs and copies of laboratory data. If remediation activities occurred on site, the report may include: copies of daily field reports; waste manifests; and information about the disturbance of subsurface materials, the type and thickness of any fill placed on site, and fill placement practices, among other types of documentation. *Do not separate supplemental documentation from the report. Do not, and do not permit any other party to redraw or modify any of the supplemental documentation for incorporation into other professionals' instruments of service.*

Understand the Role of Standards

Unless they are incorporated into statutes or regulations, standard practices and standard guides developed by the American Society for Testing and Materials (ASTM) and other recognized standards-developing organizations (SDOs) are little more than aspirational methods agreed to by a consensus of a committee. The committees that develop standards may not comprise those best-qualified to establish methods and, no matter what, no standard method can possibly consider the infinite client- and project-specific variables that fly in the face of the theoretical "standard conditions" to which standard practices and standard guides apply. In fact, these variables can be so pronounced that geoenvironmental professionals who comply with every directive of an ASTM or other standard procedure could run afoul of local custom and practice, thus violating the standard of care.

Accordingly, when geoenvironmental professionals indicate in their reports that they have performed a service "in general compliance" with one standard or another, it means they have applied professional judgement in creating and implementing a scope of service designed for the specific client and project involved, and which follows some of the general precepts laid out in the referenced standard. To the extent that a report indicates "general compliance" with a standard, you may wish to speak with your geoenvironmental professional to learn more about what was and was not done. *Do not assume a given standard was followed to the letter.* Research indicates that that seldom is the case.

Realize that Recommendations May Not Be Final

The technical recommendations included in a geoenvironmental report are based on assumptions about actual conditions, and so are preliminary or tentative. Final recommendations can be prepared only by observing actual conditions as they are exposed. For that reason, you should retain the geoenvironmental professional of record to observe construction and/or remediation activities on site, to permit rapid response to unanticipated conditions. *The geoenvironmental professional who prepared the report cannot assume responsibility or liability for the report's recommendations if that professional is not retained to observe relevant site operations.*

Understand That Geotechnical Issues Have Not Been Addressed

Unless geotechnical engineering was specifically included in the scope of professional service, a report is not likely to relate any findings, conclusions, or recommendations about the suitability of subsurface materials for construction purposes, especially when site remediation has been accomplished through the removal, replacement, encapsulation, or chemical treatment of on-site soils. The equipment, techniques, and testing used by geotechnical engineers differ markedly from those used by geoenvironmental professionals; their education, training, and experience are also significantly different. If you plan to build on the subject site, but have not yet had a geotechnical engineering study conducted, your geoenvironmental professional should be able to provide guidance about the next steps you should take. The same firm may provide the services you need.

Read Responsibility Provisions Closely

Geoenvironmental studies cannot be exact; they are based on professional judgement and opinion. Nonetheless, some clients, contractors, and others assume geoenvironmental reports are or certainly should be unerringly precise. Such assumptions have created unrealistic expectations that have led to wholly unwarranted claims and disputes. To help prevent such problems, geoenvironmental professionals have developed a number of report provisions and contract terms that explain who is responsible for what, and how risks are to be allocated. Some people mistake these for "exculpatory clauses," that is, provisions whose purpose is to transfer one party's rightful responsibilities and liabilities to someone else. Read the responsibility provisions included in a report and in the contract you and your geoenvironmental professional agreed to. *Responsibility provisions are not "boilerplate."* They are important.

Rely on Your Geoenvironmental Professional for Additional Assistance

Membership in ASFE exposes geoenvironmental professionals to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a geoenvironmental project. Confer with your ASFE-member geoenvironmental professional for more information.

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1 SUMMARY

This Phase I Environmental Site Assessment (ESA) was conducted for Pacland Inc. on an approximately 76.4-acre property located at Bridgehead Road and Main Street (Highway 4) in Oakley, California ("site"). At the time of Kleinfelder's site reconnaissance, the site consisted of a vineyard. It is Kleinfelder's understanding that the proposed use of the site is a Wal-Mart retail store. In summary, Kleinfelder's assessment revealed the following information pertaining to the subject site.

Due to the historical agricultural use of the site, pesticides and fertilizers have likely been applied to the site. The subject site has been included in several assessments conducted in the past in which soils samples were collected and analyzed for organochlorine pesticides. Several pesticides were detected in those soil samples, however reported concentrations were below residential PRGs.

- A DuPont facility located at 6000 Bridgehead Road (DuPont) adjoins the subject property to the north, and was involved in the manufacture of chemicals including tetraethyl lead, Freon, and TiO2 from about 1957 until 1998. Characterization of soil and groundwater conditions, as well as remediation efforts, at this facility began in the 1980s and continue through the present time. A number of contaminants have been detected in soil and groundwater at the DuPont facility, and three groundwater contaminant plumes have been defined. The southeastern edge of one of the plumes, designated Plume 3, has been mapped across the northwestern corner of the non-subject site portion of the Cline property (north of the railroad). Constituents of concern associated with Plume 3 include PCE and related daughter products. Environmental sampling of the subject property conducted in 1999 and 2002, as well as continued groundwater monitoring and sampling conducted by DuPont indicate that the subject property has not been adversely impacted by its proximity to DuPont. The groundwater contaminant plumes below the DuPont facility appear to be well defined, and soil and groundwater characterization and remediation continue under DTSC oversight.
- Delta Scrap & Salvage, located at 1371 Main Street, adjacent to the south of the site appears on the Contra Costa Co. Site List. Delta Scrap & Salvage has been

used to crush and recycle vehicles. Our experience with environmental investigations of auto salvage businesses in this area, and their reputations for having poor waste handling practices, both indicate the potential for a release of petroleum products from the Delta Scrap & Salvage facility.

- A PG&E gas distribution facility at 5900 Bridgehead Road, is located adjacent to the site to the northwest. A recent investigation of this site revealed significant concentrations of petroleum hydrocarbons in groundwater. Based on the expected groundwater gradient directed to the north, we would not expect that the subject site has been impacted by the release, however, if desired, a greater amount of certainty may be obtained through the collection and analysis of groundwater samples in the vicinity of the northwestern site boundary.
- Bridgehead Inc. (Arco Products #6031) located at 5540 Bridgehead Road, adjacent to the southwest of the site, appears on the LUST and Cortese database due to a leaking UST that affected the aquifer. Groundwater monitoring was conducted at the site from 1996 through 2000, during which the lateral extent of the groundwater plume was defined and a pattern of decreasing petroleum hydrocarbons was established. The case was closed by the RWQCB. Groundwater flow at the site was consistently to the northwest (away from the subject site) and the highest petroleum hydrocarbons concentrations were reported in the southwest corner of the facility, approximately 150 feet south of the subject site. The facility had groundwater monitoring well (MW-1), located approximately 100 feet west of the subject site. Trace concentrations of toluene, ethylbenzene, xylenes, and MTBE were detected in MW-1, only during the November 1996 sampling event. TPH-d was detected during two sampling events in 1996 and one in 1997, with reported concentrations of 910 micrograms per liter (ug/l), 920 ug/l, and 14,000 ug/l. No petroleum hydrocarbons are reported to have been detected in the groundwater collected from MW-1 during the last four sampling events at the facility, conducted in 1998.

Kleinfelder's findings, and conclusions are discussed in Chapter 9 of this report. This report is subject to the limitations in Chapter 2. Any party other than the client who would like to use this report shall notify Kleinfelder, of such intended use in writing for permission.

2 INTRODUCTION

2.1. PURPOSE

Kleinfelder conducted a Phase I Environmental Site Assessment (ESA) of the subject site. Kleinfelder performed this ESA in general accordance with the scope and limitations of the American Society of Testing and Materials (ASTM); Standard Practice for Phase I Environmental Site Assessment Process E1527-00, Wal-Mart's *Phase I Environmental Site Assessment and Report Requirements* dated October 1, 2004, and our proposal PIT5P166, dated August 10, 2005, subsequently approved by PACLAND, Inc. as our client.

The purpose of this assessment is to assist the client in identifying recognized environmental conditions associated with the subject property's past and current use. A recognized environmental condition is defined by the ASTM standard as "the presence or likely presence of hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater or surface water of the property". The term includes hazardous substances or petroleum products even under conditions in compliance with laws.

Resumes of the personnel preparing this report can be obtained by request.

2.2. DETAILED SCOPE-OF-SERVICES

The following sections describe Kleinfelder's work scope:

- Chapter 2, **Introduction**, includes a discussion of the purpose/reason for performing the Phase I ESA; additional services requested by the client (e.g. an evaluation of business environmental risk factors associated with the property); significant assumptions (e.g. property boundaries if not marked in the field); limitations, exceptions, and special terms and conditions (e.g. contractual); and user reliance parameters.

- Chapter 3, **Site Setting**, is a compilation of information concerning the site location, legal description (if available), current and proposed use of the subject site, a description of structures and improvements on site at the time of Kleinfelder's assessment, and current uses of adjoining properties.

- Chapter 4, **Records Review**, is a compilation of Kleinfelder's review of several databases available from Federal, State, and local regulatory agencies regarding hazardous substance use, storage, or disposal at the subject site; and for off-site facilities up to a mile radius from the site. Environmental liens or activity and use limitations are included in this chapter. Records provided by the client are summarized and copies of relevant documents are included in the Appendices of this report. Interviews and telephone conversations conducted by Kleinfelder with people knowledgeable about the site (including the client) and local regulatory personnel are included in Chapter 8.

- Chapter 5, **History of the Site**, summarizes the history of the site and adjoining properties. This history is based on various sources which may include: a review of aerial photographs, Sanborn Fire Insurance Maps, city or suburban directories, historical topographic maps, building department records, previous assessments, and a chain-of-title/ preliminary title report (if provided by the client).

- Chapter 6, **Site Reconnaissance**, describes Kleinfelder's site observations during the site reconnaissance. The methodology used and limiting conditions are described.

- Chapter 7, **Interviews**, is a summary of telephone and personal interviews conducted with "Key Site Managers" that may include the owner/manager of the facility, occupants/tenants, local government officials, and the client. Additional interview sources may be contacted if "Key Site Managers" are not available prior to production of this report and include adjacent landowners and people with historical knowledge of the area.

- Chapter 8, **Evaluation**, is a presentation of our findings and opinions regarding the information in Chapters 3 through 8;

- Chapter 9, **References,** is a summary of the resources used to compile this report. Pertinent documentation regarding the subject site is included in Appendices of this report.

2.3. SIGNIFICANT ASSUMPTIONS

The subject property is hereafter referred to as the "site".

2.4. LIMITATIONS AND EXCEPTIONS

In addition to the standard ESA scope items listed in ASTM E 1527, several Business Environment Risk Considerations are outlined in Wal-Mart's *Phase I Environmental Site Assessment and Report Requirements* (rev. October 2004). However, since the site is currently undeveloped land, the following items Business Environment Risk items do not apply and are not addressed in this report:

- Asbestos-containing building materials;
- Lead-based paint;
- Regulatory compliance;
- Industrial hygiene;
- Health and safety; and
- Indoor air quality.

Phase I ESAs are non-comprehensive by nature and are unlikely to identify all environmental problems or eliminate all risk. This report is a qualitative assessment. Kleinfelder offers a range of investigative and engineering services to suit the needs of our clients, including more quantitative investigations. Although risk can never be eliminated, more detailed and extensive investigations yield more information, which may help you understand and better manage your risks. Since such detailed services involve greater expense, we ask our clients to participate in identifying the level of service, which will provide them with an acceptable level of risk. Please contact the signatories of this report if you would like to discuss this issue of risk further. No warranty/guarantee is given either expressed or implied.

Kleinfelder performed this environmental assessment in general accordance with the guidelines set forth in the ASTM Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (Designation E-1527-00), and our proposal PIT5P166, dated August 10, 2005. No warranty, either express or implied is made. Environmental issues not specifically addressed in the report were beyond the scope of our work and not included in our evaluation.

Land use, site conditions (both on-site and off-site) and other factors will change over time. Since site activities and regulations beyond our control could change at any time after the completion of this report, our observations, findings and opinions can be considered valid only as of the date of the site visit. This report should not be relied upon after 180 days from the date of its issuance (ASTM Standard E-1527, Section 4.6).

2.5. SPECIAL TERMS AND CONDITIONS

No special terms and conditions in addition to those discussed in the previous Chapters were agreed to by the User and Kleinfelder.

2.6. USER RELIANCE

The information provided by Kleinfelder is for the exclusive use of PACLAND, Inc. Wal-Mart Stores, Inc., and Wal-Mart Real Estate Business Trust. The scope of services performed during this investigation may not be appropriate for other users, and any use or re-use of this document, or the findings, conclusions, or recommendations presented herein are at the sole risk of said user. This report is intended to be used in its entirety. No excerpts may be taken to be representative of the findings of this assessment. Any party other than Pacland, Inc. and Wal-Mart Stores, Inc. who would like to rely on this report shall notify Kleinfelder of such intended use by contacting the signatories of this report. Based on the intended use of the report, Kleinfelder may require that additional work be performed and that an updated report be issued.

3 SITE SETTING

The site setting is presented to assess the significance of potential on- and off-site contaminant migration, if present. The site location is shown on Plate 1 in Appendix A. Tables 1 through 5 provide the physical characteristics of the site and bordering properties.

3.1. LOCATION AND LEGAL DESCRIPTION

The information presented in Table 1 describes the physical location and legal description of the subject site. This information was obtained from maps, public records, and interviews.

Table 1
Location And Legal Description

ADDRESSES	There are no addresses associated with the site.
HISTORICAL ADDRESSES	There are no known historical addresses associated with the subject site.
LOCATION	Northeast corner of Main Street and Bridgehead Road
TOWNSHIP & RANGE	Section 22, Township 2 North, Range 2 East
ASSESSOR'S PARCEL NUMBER	037-040-015 and 007
LEGAL DESCRIPTION	A legal description was not provided
ACREAGE	Approximately 76-acres
POTABLE WATER	None provided
SEWER	None
ZONING	This site is zoned as HI (heavy Industrial)

3.2. SITE AND VICINITY GENERAL CHARACTERISTICS

The site is located in an area of level terrain. Land use on site was grape vineyard at the time of Kleinfelder's assessment; no structures were observed to be present on the subject property. Groundwater information is included on Table 2 below.

TABLE 2
GROUNDWATER INFORMATION

DEPTH TO REGIONAL GROUNDWATER AND GROUNDWATER FLOW DIRECTION (Source: Boring logs from a Phase II Environmental Assessment of the Subject property (URS Greiner Woodward Clyde, 1999)	According to the report by URS Greiner Woodward Clyde, the depth to groundwater is approximately 6-14 feet below ground surface (bgs). The estimated direction of groundwater flow is to the north-northwest. Groundwater depth and flow direction may be influenced by local pumping, rainfall, and irrigation patterns. Evaluation of such factors is beyond the scope of this assessment.

3.3. CURRENT/PROPOSED USE OF THE PROPERTY

Current and proposed uses are described in Table 3.

TABLE 3
CURRENT/PROPOSED USES

CURRENT USE	The site is a grape vineyard
PROPOSED USE	The proposed use of the site is a Wal-Mart store.

3.4. DESCRIPTION OF STRUCTURES/IMPROVEMENTS

Structures and/or improvements observed on site at the time of Kleinfelder's site reconnaissance are described in Table 4.

TABLE 4
STRUCTURES/IMPROVEMENTS

	GENERAL OBSERVATIONS
STRUCTURES	No structures are present on the site.
IMPROVEMENTS	Approximately one-irrigation well/ pump, a Contra Costa County pump, Power poles trending north/ south along the eastern border and the southern border of the site, a water main, irrigation standpipes, and four monitoring wells.

3.5. CURRENT USES OF ADJOINING PROPERTIES

Kleinfelder conducted a brief drive-by survey of the parcels adjoining the site on September 15, 2004. A summary of the surrounding properties is presented on Table 5.

TABLE 5
SURROUNDING PROPERTIES

North	The Burlington Northern, and Santa Fe Railroad beyond which are vineyards, PG&E gas pipelines, and the DuPont facility.
South	Main Street (Highway 4) beyond which are residential and commercial buildings
East	Railroad tracks and agricultural land.
West	Arco gas station, Bridgehead Road, beyond which are gas stations, a hotel, and a mobile home park.

The adjacent properties west and south of the subject site contained gas stations. These facilities may use, store, or have had prior releases of hazardous substances. Refer to Section 4 for additional information.

4 RECORDS REVIEW

4.1. STANDARD ENVIRONMENTAL RECORD SOURCES

The purpose of the records review is to obtain and review records that would help to evaluate recognized environmental conditions in connection with the subject site and bordering properties.

Federal, State and local regulatory agencies publish databases or "lists" of businesses and properties that handle hazardous materials or hazardous waste, or are the known location of a release of hazardous substances to soil and/or groundwater. These databases are available for review and/or purchase at the regulatory agencies, or the information may be obtained through a commercial database service. Kleinfelder contracted with a commercial database service, Environmental Data Resources (EDR), to review the regulatory agency lists for references to the site and any listings within the appropriate ASTM minimum search distance to the site. The EDR database search results are included in Appendix B, Regulatory Agency Database Summary. A description of the types of information contained in each of the databases reviewed and the agency responsible for compiling the data is included in the EDR Radius Report. The Federal and State databases reviewed by EDR are summarized in Table 6.

TABLE 6
RECORDS REVIEW-SEARCH DISTANCE

FEDERAL		STATE	
NPL	1-mile	Cal-Sites, BEP, AWP	1-mile
RCRA-CORRACTS TSDF	1-mile	CORTESE	½-mile
CERCLIS	½-mile	LUST	½-mile
RCRA-non CORRACTS TSD	½-mile	SLIC	½-mile
RCRA-GEN	Site & adjoining	SWIS/SWAT	½-mile
CERCLIS-NFRAP	Site & adjoining	UST	Site & adjoining
ERNS	Site Only		

The subject site was not listed on regulatory agency databases researched by EDR.

There are 10 offsite facilities listed within the ASTM regulatory agency databases researched by EDR:

- Mello's Sheet Metal, located at 1242 Main Street, adjacent to the south of the site appears on the UST and Contra Costa Co. Site List databases. No violations were found for the site; it does not appear that this facility poses an environmental concern to the site.

- Palex, located at 1315 Main Street, adjacent to the south of the site appears on the HAZNET, Contra Costa Co. Site List, and CA WDS databases. The facility appears on the HAZNET database due to liquids with halogenated organic compounds >1000mg/l, aqueous solutions with less than 10% total organic residues, and unspecified oil-containing wastes which are disposed of at a transfer station. The facility appears on the CA WDS database due to it containing a waste discharge system. No violations were found for the site; it does not appear that this facility poses an environmental concern to the site.

- Shell (Antioch Shell), located at 5545 Bridgehead Road, adjacent to the west of the site appears on the UST, HAZNET, and SWEEPS UST databases. The facility appears on the HAZNET database due to empty containers less than 30 gallons, which are disposed of at a recycler. No violations were found for the site; it does not appear that this facility poses an environmental concern to the site.

- Bridgehead Inc. (ARCO Products #6301), located at 5540 Bridgehead Road, adjacent to the southwest corner of the site appears on the HAZNET, LUST, Cortese, CHMIRS, and Contra Costa Co. Site List databases. The facility appears on the HAZNET database due to aqueous solutions with less than 10% total organic residues, which are disposed of at a recycler. The facility appears on the CHMIRS database due to a release caused by a hose at the service station that came loose and spilled 10-gallons of gasoline on October 13, 2001. The facility appears on the LUST and Cortese databases due to a leaking underground storage tank. The chemical involved is gasoline, which reportedly affected the aquifer. The leak was discovered on March 23, 1993 during tank closure. MTBE was tested for and detected at 43 parts per billion. The case was closed on June 20, 2003. This facility is discussed in section 5.6 (Previous Assessments).

- Delta Scrap & Salvage, located at 1371 Main Street, adjacent to the south of the site appears on the Contra Costa Co. Site List. No violations were found for the site, however, our experience with environmental investigations of auto salvage businesses in this area, and their reputations for having poor waste handling practices, both indicate the potential for a release of petroleum products

- A PG&E gas distribution facility at 5900 Bridgehead Road, is located adjacent to the site to the northwest. A recent investigation of this site revealed significant concentrations of petroleum hydrocarbons in groundwater. Based on the expected groundwater gradient directed to the north, we would not expect that the subject site has been impacted by the release, however a greater amount of certainty may be obtained through the collection and analysis of groundwater sample in the vicinity of the northwestern site boundary.

- G E Sales, located at 5801 Bridgehead Road, adjacent to the west of the site appears on the Contra Costa Co. Site List. No violations were found for the site; it does not appear that this facility poses an environmental concern to the site.

- Chevron #9-3801, located at 5433 Neroly Road, approximately 500 feet southwest of the site appears on the LUST, Cortese databases. The facility appears on the LUST and Cortese databases due to a leaking underground storage tank. The chemical is gasoline, which reportedly affected the aquifer. MTBE was tested for and detected at 4.2 parts per billion. The case was closed on May 29, 2002. Based on this status the facility does not appear to pose an environmental concern to the site. If contamination attributable to Chevron #9-3801 is discovered on site, the expense and/or liability associated with any necessary investigation or remediation would typically fall upon the responsible party (i.e. Chevron #9-3801).

- Dupont Antioch Works (Dupont Chemical Co.), located at 6000 Bridgehead Road, approximately 500 feet north of the site appears on the LUST, Cortese, CA FID UST, SLIC, and RCRA-TSDF databases. The facility appears on the CA FID UST database due to it being an active underground storage tank location. The facility appears on the LUST and Cortese database due to the release of gasoline from an underground storage tank, which affected the aquifer. The leak was discovered on August 21, 1986 during tank closure. Remedial action is currently underway at the site. The facility appears on the SLIC database due to the release of SUB004, SUB005, SUB015, SUB030, and SUB031, which is under a remediation plan. See Section 4.2 for additional information.

- Waste Fiber Recovery, located at Hwy 4, approximately 1300 feet west of the site appears on the SLIC and Contra Costa Co. Site List. The facility appears on the SLIC database due to the release of 128, and PET. Based on the distance from the subject site the facility does not appear to pose an environmental concern to the site.

4.2. ADDITIONAL AGENCY ENVIRONMENTAL RECORDS

Local regulatory agencies were contacted for reasonably ascertainable and practically reviewable documentation regarding recognized environmental conditions present at the subject site and adjacent facilities. Interviews with local regulatory agency representatives are included in Chapter 8 of this report, and copies of the documentation obtained by Kleinfelder is included in Appendix D of this report. The following agencies were contacted for documentation.

- ***Contra Costa County Agricultural Commissioners office (CCCACO)*** files contained pesticide use reports submitted to the State of California in connection with the Dupont site. CCCACO records indicate that the agricultural chemicals Platte Dusting Sulfur and Roundup were applied to the wine grapes located onsite.

- ***Contra Costa County Environmental Health Division (CCC/EHD)*** was contacted on September 8, 2005 for information regarding underground storage tanks, reported violations and hazardous materials and/or petroleum product incidents. According to CCC/EHD there are no files in their database for the subject site. CCC/EHD had the following files in their database for the adjacent properties:

Dupont, located at 6000 Bridgehead Road.

The Department of Toxic Substance Control (DTSC) was contacted on September 8, 2005 for information regarding underground storage tanks, reported violations and hazardous materials and/or petroleum product incidents. According to Ms. Bobbi Jensen, there are no files for the site. DTSC contains files for the following address: 6000 Bridgehead Road.

The subject site is included as a part of the subject area of several environmental reports. The area of assessment in the reports is referred to as both the Vineyard Area Buffer Zone, DuPont Antioch Works, and the Cline Property, both of which include the subject site and the vineyards north of the Atchison Topeka and Santa Fe Railroad and southeast of the DuPont facility. The following is a summary of the available reports as they relate to the subject site.

Tank Removal Results, 6000 Bridgehead Road, Antioch, CA: Woodward-Clyde, 1998

The report documents the removal of two USTs of 550 and 350 gallon capacity under permit to the CCCHMD and Contra Costa Fire Protection District. Soil samples were collected from approximately two feet below the bottom of each UST, in which no constituents of concern were detected and no further action in regard to the USTs was recommended. A map of the approximate location of the UST removal indicated that it was not located on the subject site, but on the north adjacent property, approximately 1000 feet north of the subject site.

Phase II Environmental Assessment, Vineyard Buffer Zone, Du Pont Antioch Works, Antioch, CA: URS Geiner Woodward Clyde, May 7 1999

During a Phase I and Phase II assessment, soil and groundwater samples were collected from 14 borings located in the vineyard area. Five of the borings (ANT-DV-1,2,5,8, and 9) were located on the subject site, while the remainder were located on the Cline property north of the railroad tracks. The samples were analyzed for Total petroleum hydrocarbons as diesel (TPH-d), benzene, toluene, ethylbenzene, and xylenes (BTEX), volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), organochlorine pesticides, pesticides and herbicides, and Title 22 metals.

TPH-d and PCBs were not detected in any of the soils samples collected from the borings located on the subject site. The VOC acetone was detected in all of the soil samples with reported concentrations ranging from 0.025 to 0.11 mg/kg. The presence of the metals arsenic, barium, chromium, cobalt, copper, lead, nickel, selenium, vanadium, and zinc was reported in at least some of the soil samples collected from the subject site. Low concentrations of the organochlorine pesticides Beta BHC (0.0087 mg/kg) and 4,4' DDT (0.003 mg/kg) were detected in a single soil sample. In addition the pesticides/herbicides 2,4-D and 2,4,5-T were each detected in a single sample, and 2,4-D was detected in all of the soil samples collected from the site. According to the report, none of the constituents discussed exceeded the industrial or residential EPA Preliminary Remediation Goals (PRGs), although there is some uncertainty as to which contaminant 2,4,5-T refers.

The groundwater samples collected from borings located on the subject site during the 1999 assessment did not contain detectable concentrations of SVOCs, PCBs, metals, organochlorine pesticides, or pesticides and herbicides. Concentrations of TPH-d were reported in the groundwater samples ranging from None Detected to 1.51 mg/l, and methylene chloride ranging from None Detected to 0.019 mg/l, however, a QA/QC assessment indicated that laboratory and/or sampling equipment contamination may have resulted in false detection of these constituents.

The Woodward-Clyde report concluded, "if the Vineyard Property is to remain in agricultural use, no further site environmental exploration is recommended." This report is included in Appendix E.

Supplemental Information Related to Phase II Environmental Assessment of the Cline Property; Dupont Engineering, September 10, 2002

This letter report was produced for DTSC to request removal of the Cline property from further regulatory oversight. According to the report, the property was used as vineyard before, during, and after DuPont's ownership of the property. The report also stated that DuPont did not conduct manufacturing operations on the site, and that there were no solid waste management units or other areas of concern located on the Cline property, with the possible exception of the access road across in the northeastern area of the property. The road had reportedly been constructed using Sierra-Crete as a road base. Sierra-Crete was a DuPont product that had been found to potentially contain dioxins. The road referred to is not on the subject site. No improved roadways were observed on the subject site by Kleinfelder during the site reconnaissance or during reviews of Arial photographs. In addition samples of Sierra-Crete were collected from beneath road constructed on the DuPont property, including three sample locations approximately 100 to 200 feet north of the northeastern section of the subject site. Three soil samples were also collected from the vineyards in the non-subject site portion of the Cline property. Concentrations of total dioxins in the samples collected from the Cline property ranged from 0.8 ppt to 2.0 ppt World Health Organization Total Toxic Equivalent (WHO-TEQ), below the residential PRG for dioxin of 4ppt WHO-TEQ. Total dioxin concentrations in the 15 Sierra-Crete samples collected from beneath roads constructed at the DuPont facility ranged from 69 to 318 ppt WHO-TEQ, reportedly below the DTSC action level for dioxin in residential soils of 1,000 ppt.

Also included in the letter report is information regarding two monitoring wells located in the vicinity of the southern boundary of the subject site. The monitoring wells designated as MW-59 and MW-60, were installed by DuPont in 1996, to depths of 61 and 85 feet bgs, respectively. The reported purpose of the well installation was for the collection of background data. Three shallow borings were also advanced in the vicinity of the monitoring wells to a depth of six feet, from which soil samples were collected at 1, 3, and 6 feet bgs. The groundwater and soil samples were analyzed for the presence of lead, arsenic, fluoride, and VOCs. CT, PCE, and toluene were reported in the initial analysis of groundwater from the monitoring wells, however, confirmation sampling was conducted and the analytes were not detected. The conclusion by DuPont was that the initial groundwater sampling results were false positives. The soil samples were reported to contain lead (maximum of 6.3 mg/kg), arsenic (maximum of 2.7 mg/kg), and fluoride maximum 0.98 mg/kg). Only fluoride was reported in the WET extract samples with a maximum concentration of 0.23 mg/l. This report is included in Appendix E.

Contra Costa County Sierra-Crete Task Force, Human Health Risk Assessment of Sierra Crete; February 28, 2003

The potential for exposure to Sierra-Crete and associated dioxins was assessed by the CCC Sierra-Crete Task Force, which concluded that the presence of Sierra-Crete "poses no significant health risks to the residents of East Contra Cost County."

Cline Vineyard Property Investigation Report; DuPont Remediation Group, September 30, 2004

The report details DuPont's response to concerns of DTSC regarding issues on the non-subject site portion of the Cline Property. In response to the detection of CT in one boring (DV-17) during the 1999 investigation, five additional groundwater samples were collected in the vicinity of DV-17 in which no VOCs were detected. The report also documents the result of soil sampling in the vicinity of the structures on the non-subject site portion of the Cline property, in which reported concentrations of DDD and DDE were greater than the associated residential PRGs. The report recommended the excavation of approximately 350 square feet to depths ranging from 1 to 1.5 feet bgs, based upon the soil sampling results. This report is included in Appendix E.

2004 Annual Groundwater Monitoring Report For DuPont Oakley Site, Dupont Remediation, March 25,2005

Kleinfelder reviewed the 2004 Annual Groundwater Monitoring Report for most recent available details on the lateral extent of the documented groundwater contaminant plumes originating from the historical DuPont facility. The plumes have been categorized into three regions and are identified as Plumes 1, 2, and 3. The following identifies the constituents of concern as described in the report:

- Plume 1: Tetrachloroethane (PCE); carbon tetrachloride (CT); trichloromethane (TCM); methylene chloride; 1,1,2- trichlorotrifluoroethane (CFC-113); trichlorofluoromethane (CFC-11); dichlorodifluoromethane (CFC-12); 1,2-dichloroethane (1,2-DCA); 1,2-dibromoethane (1,2-DBA); arsenic; fluoride; lead; and organolead
- Plume 2: Organolead; lead; 1,2-DCA; 1,2-DBA; and PCE
- Plume 3: PCE and related daughter products

The report stated that the rate and direction of groundwater flow is consistent with historical ranges, and that the groundwater generally flows towards the surface water bodies (away from the subject site). A comparison between the 2003 and 2004 results indicated that the constituent concentrations and plume extents appear to be remaining stable. The report states that historic groundwater concentration trends and chemical and geochemical data collected from 2004 indicate Plumes 2 and 3 and parts of Plume 1 appear to be attenuating on site. Plume maps included in the report indicate that the southern boundary of Plume 3 (contaminant plume nearest to the site) is located approximately 900 feet north of the subject site. The Groundwater Monitoring Program included in the report indicated that the wells located on the subject site (MW-59, MW-60, and PZ-17) are currently analyzed for arsenic, lead, organic lead, and fluoride. Only lead and fluoride were detected during groundwater monitoring in 2004, with maximum concentrations of 4.5 ug/l (MW-59) and 730 ug/l (MW-60), respectively, both of which are below California Primary MCLs. While complete historical groundwater monitoring data was not available for review, included in an Environmental Assessment conducted by Clayton Group (discussed in Section 5.2 of this report) included the following statement: "Historic groundwater monitoring data indicates groundwater contaminants have not been reported in samples collected from either PZ-17 and PZ-36. Trace concentrations of VOCs have been reported in MW-59 and MW-60, but have not appeared in groundwater samples collected from these wells since January 1999." This report is included in Appendix D.

- ***California State Fire Marshal Pipeline Safety Office (CSFMPSO)*** was contacted on September 2, 2005 for information regarding pipelines within the area of the subject site. According to an E-mail received from Lisa Dowdy of the CSFMPSO, there are no pipelines in the area of the subject site.

- ***Regional Water Quality Control Board (RWQCB)*** was contacted on September 12, 2005 for information regarding the subject site and adjacent properties. According to the clerk there are no files in their database for the subject site.

4.3. PHYSICAL SETTING

Table 7 presents information about the physical setting of the site. This information was obtained from published maps.

TABLE 7
PHYSICAL SETTING

USGS TOPOGRAPHIC QUADRANGLE	California Department of Water Resources, Topographic Map, Rio Vista, CA Quadrangle 1978.	The elevation of the site is approximately 30 feet above mean sea level. No structures are located on the subject site. The site appears as agricultural and orchard land. Three dirt roads are depicted trending north/south through the eastern portion of the site. The Atchinson Topeka and Santa Fe railroad borders the site to the north. Roads are depicted to the west and south of the site.
GEOLOGIC MAP	Regional Geologic Map Series, Sacramento Quadrangle, Map No. 1A, 1987,; Scale: 1 inch = 12 miles.	The subject site and the adjacent properties are shown as overlying the Montezuma Formation.
SOIL TYPE	Soil Survey of San Joaquin County, United States Department of Agriculture, October 1992.	The soil at the site consists of Veritas. Veritas is identified as a fine sandy loam soil.
OIL AND GAS FIELDS	ftp://ftp.consrv.ca.gov/pub/oil/maps/dist6/611/Map611.pdf	According to this web page, there are no gas or oil wells located on the site.

Information about the regional geology is presented on Table 8. This information was obtained from published data and maps, interviews with public agencies, and/or from previous investigations conducted by Kleinfelder in the vicinity of the site.

TABLE 8
REGIONAL GEOLOGY

REGIONAL GEOLOGY (California Division of Mines and Geology, Regional geological Map 1A, Sacramento Quadrangle, 1987).	The subject site and the adjacent properties are shown as overlying the Montezuma Formation.

4.4. USER PROVIDED INFORMATION

There is no user provided information regarding this site.

5 HISTORICAL USE OF THE PROPERTY AND ADJOINING PROPERTIES

The history of the site was researched to identify obvious uses of the site from the present to first developed use, or back to 1940, whichever is earlier, from readily available resources. Table 9 summarizes the availability of information reviewed during this assessment.

TABLE 9
HISTORICAL SOURCES

	Years reviewed	Availability
AERIAL PHOTOGRAPHS	1939, 1958, 1965, 1971, 1984, 1993, 1998	EDR Aerial Photographs.
SANBORN FIRE INSURANCE MAPS	Not available	According to EDR there is no Sanborn Map coverage for the subject site.
POLK AND HAINES CRISS-CROSS DIRECTORIES	Not available	Antioch Contra Costa County Library
HISTORICAL TOPOGRAPHIC MAP REPORT	1910, 1952, 1953, 1952 photorevised 1968, 1953 photorevised 1968, 1978	EDR topographic map search.
BUILDING DEPARTMENT	All Available	City of Oakley Building Department and the Contra Costa County Building Department
PREVIOUS ASSESSMENT(S)	February 1, 2005	Clayton Group Services, Inc. Phase I Environmental site assessment "Cline Cellars", Big Break Road and Highway 4 Oakley, California" included in Appendix E.
CHAIN-OF-TITLE OR PRELIMINARY TITLE REPORT	Placer Title Company, dated June 2, 2005	A Chain of Title and/or a Preliminary Title Report were provided to Kleinfelder for review and inclusion into this report and is included in Appendix F.

5.1. AERIAL PHOTOGRAPHY

Historical aerial photographs were reviewed to evaluate past land use at the site and in the surrounding area. A summary of the aerial photographs reviewed is presented, as follows:

TABLE 10
AERIAL PHOTOGRAPHS REVIEWED

Date	Photo ID	Scale	Type	Source	Quality
1939	1502948.6	1 inch = 555 feet	Black and White	EDR	Good
1958	1502948.6	1 inch = 555 feet	Black and White	EDR	Good
1965	1502948.6	1 inch = 333 feet	Black and White	EDR	Good
1971	1502948.6	1 inch = 333feet	Black and White	EDR	Good
1984	1502948.6	1 inch = 690 feet	Black and White	EDR	Poor
1993	1502948.6	1 inch = 666 feet	Black and White	EDR	Good
1998	1502948.6	1 inch = 666 feet	Black and White	EDR	Good

Year: 1939
Photo I.D.: 1502948.6
Scale: 1 inch = 555 feet
Type: Black and White
Quality: Good

The eastern edge of the site is not visible in the aerial photograph. The site appears primarily as agricultural row crop and orchard. No onsite structures are noted. A road borders the site to the south and west. A railroad line borders the site to the north. North, south and west of the site is agricultural land with rural residences.

Year: 1958
Photo I.D.: 1502948.6
Scale: 1 inch = 555 feet
Type: Black and White
Quality: Good

The eastern edge of the site is not visible on the aerial photograph. The site and adjacent properties are essentially unchanged from the 1939 aerial photograph, with the exception of residential and commercial structures located on the southeast corner adjacent to the site and a large industrial facility north of the site beyond the railroad tracks.

Year: 1965
Photo I.D.: 1502948.6
Scale 1 inch = 333 feet
Type: Black and White
Quality: Good

The eastern portion of the site is not visible in the aerial photograph. The site appears essentially unchanged from the 1958 aerial photograph, with the exception of additional orchards on the property. The surrounding properties appear essentially unchanged, with the exception of additional commercial structures south and west of the site, and a trailer park west of the site.

Year: 1971
Photo I.D.: 1502948.6
Scale: 1 inch = 333 feet
Type: Black and White
Quality: Good

The eastern portion of the site is not visible in the aerial photograph. The subject site and adjacent properties are essentially unchanged from the 1965 aerial photograph, with the exception of additional commercial/industrial facilities south of the site.

Year: 1984
Photo I.D.: 1502948.6
Scale: 1 inch = 690 feet
Type: Black and White
Quality: Poor

The eastern portion of the site is not visible in the aerial photograph. The subject site and adjacent properties are essentially unchanged from the 1971 aerial photograph.

Year: 1993
Photo I.D.: 1502948.6
Scale: 1 inch = 666 feet
Type: Black and White
Quality: Good

The eastern portion of the site is not visible in the aerial photograph. The center of the subject site is no longer covered by orchard. Only a small section of orchard is located along the southern border of the site. The surrounding properties appear essentially unchanged from the 1984 aerial photograph.

Year: 1998
Photo I.D.: 1502948.6
Scale: 1 inch = 666 feet
Type: Black and White
Quality: Good

The eastern portion of the site is not visible in the aerial photograph. The subject site and adjacent properties are essentially unchanged from the 1993 aerial photograph.

NOTE: Aerial photographs only provide information on indications of land use and no conclusions can be drawn from photographs alone. However, Kleinfelder's review of available aerial photographs did not reveal obvious signs of dumping, spilling, leaking, storage or disposal of hazardous materials or wastes on site.

5.2. SANBORN FIRE INSURANCE MAPS

Sanborn Fire Insurance Maps provide historical land use information for some metropolitan and small-established towns. Kleinfelder, Inc. requested a search of Sanborn Fire Insurance Maps. There is no Sanborn Map coverage for the subject site.

5.3. POLK AND HAINES CRISS-CROSS DIRECTORIES

Polk City Directories and Haines Criss-Cross Directories provide information regarding property occupants by address. Because the study area has no physical addresses, Polk and Haines Criss-Cross Directory information could not be obtained.

Kleinfelder reviewed the Contra Costa County Antioch Library Polk Directories for the address 60 Big Beak Road, adjacent to the site between years 1984 to 1962. The Polk Directories showed that the street was not listed between the years 1984 to 1962.

5.4. HISTORICAL TOPOGRAPHIC MAP REVIEW

Historical topographic maps (7.5 Minute Series) from the, "Historical Topographic Map Report by EDR", were reviewed (1910, 1952, 1953, 1953 photo-revised 1968, and 1978). Copies of the topographic maps are included in Appendix B of this report.

1910
Jersey Island 7.5 Minute Series
Scale: 1 inch = 2,640 feet

The subject site is depicted as vacant land. Three roads are depicted trending north/south through the eastern portion of the site. The area west of the site is not depicted on the topographical map. Vacant or agricultural property is noted north, south, and east of the site. A road is depicted bordering the site to the south. The Atchison, Topeka and Santa Fe Railroad borders the site to the north.

1952 and 1553
Riovista and Pittsburg Quad 7.5 Minute Series
Scale: 1 inch = 5,208 feet

Orchards and agricultural fields are depicted on the site. The surrounding properties are depicted as orchard and agricultural land. A road is depicted bordering the site to the west.

1952 photo-revised 1968 and 1953 photo-revised 1968
Lodi South Quad 7.5 Minute Series
Scale: 1 inch = 2,000 feet

The subject site and adjacent properties appear essentially unchanged from the 1952 and 1953 topographic maps. Six structures are depicted in the southwest corner adjacent to the subject site, and multiple large structures are depicted north of the railroad track north of the site.

1978
Terminous Quad 7.5 Minute Series
Scale: 1 inch = 2,000 feet

The subject site and adjacent properties appear essentially unchanged from the 1968 topographic map, with the exception of additional roads and buildings north of the site and a trailer park depicted west of the site.

5.5. BUILDING DEPARTMENT RECORDS

City of Oakley Building Department was contacted September 20, 2005 for information regarding structures historically or currently on site. According to the clerk there are no records for the subject property on file with the City of Oakley.

The Contra Costa County Building Department was contacted on September 14, 2005. According to the clerk there are no files for the APN 037-040-007. CCCBD contained records for the APN 037-040-015, which included permits for an agricultural pump in 1993 and electrical service to a 1 H.P. pump in 1992.

5.6. PREVIOUS ASSESSMENTS

Clayton Group Services, Inc. previously performed a Phase I Environmental Site Assessment of the Cline Cellars, Big Break Road and Highway 4, Oakley, California. The area of the assessment included both the subject site and the portion of the Cline property located north of the Atchison, Topeka, and Santa Fe Railroad. (Clayton project No. 70-05509.00, dated February 1, 2005). The ESA discussed site history and areas of potential environmental concern with past and present hazardous material on or near the site, and made conclusions regarding the subject site. The following is a list of the concerns noted by Clayton in Findings Summary of the report on the entire Cline property:

- "The subject property has been developed with orchards and/or grape vines from at least 1939 through the present time, and regulated agricultural chemicals are currently stored in a shed attached to the barn (adjacent and north of the subject site). Environmental sampling conducted at the subject property in 1999 and 2004 indicates that while detectable concentrations of pesticides were present in the vineyard areas, the reported concentrations were less than the U.S. EPA Region 9 preliminary remediation goals (PRGs) for residential soils. However, the pesticides DDE and DDT were reported in concentrations above the PRGs and Department of Toxic Substance Control (DTSC) action levels in two areas: adjacent to the pesticide storage area, and within a shed located north-northwest of the residence (both adjacent and north of the site). This finding is a REC; however, the matter is being handled by DuPont under DTSC oversight. A public discussion of the issue, along with other matters pertaining to the DuPont facility is scheduled for February 23, 2005. After a public comment period of 30 days, the areas of concern as defined during fieldwork conducted in 2004 are to be excavated and removed from the subject property." No further investigation by borrowers with regard to this matter was recommended by Clayton.

- "DuPont at 6000 Bridgehead Road (DuPont) adjoins the subject property to the north, and was involved in the manufacture of chemicals such as TEL, Freon, and TiO2 from about 1957 until 1998. Characterization of soil and groundwater conditions as well as remediation efforts at this facility began in the 1980s and continues through the present time. A number of contaminants have been detected in soil and groundwater below the facility, and three groundwater contaminant plumes have been defined. The southeastern edge of one of the plumes, designated Plume 3, has been mapped across the northwestern corner of the subject property. Constituents of concern associated with Plume 3 include PCE and related daughter products. This finding is a REC; however, environmental sampling of the subject property conducted in 1999 and 2002 as well as continued groundwater monitoring and sampling conducted by DuPont indicate that the subject property has not been adversely impacted by its proximity to DuPont. The groundwater contaminant plumes below the DuPont facility appear to be well defined, and soil and groundwater characterization and remediation continue under DTSC oversight." No further investigation by borrowers, with regard to this matter, was recommended by Clayton.

Additional environmental concerns noted in the Clayton report included a hand dug well located on the north side of the residence and a cistern located in the yard on the north side of the residence. Both of these noted concerns are associated with the residential structure that is located north of the railroad tracks and on the non-subject site portion of the Cline property.

While not included in the Findings Summary or Conclusions sections of the Clayton report, documents pertaining to the Arco located at 5540 Bridgehead Road, maintained by the CCCHMD and RWQCB, were apparently reviewed as part of the assessment. According to the Clayton report, four USTs, and associated piping and dispensers were removed from the facility in 1993 during the closure of the station. Two groundwater monitoring wells were installed at the site in 1994. After several groundwater sampling events with no reported detections of petroleum hydrocarbon constituents, the case was closed by the RWQCB and the wells destroyed in March of 1997. However, petroleum hydrocarbon constituents were discovered at the site during a geotechnical investigation in 1996 and the case was reopened by the RWQCB. Groundwater monitoring was conducted at the site from 1996 through 2000, during which the lateral extent of the groundwater plume was defined and a pattern of decreasing petroleum hydrocarbons was established. The case was again closed by the RWQCB. The Clayton report states that the groundwater flow at the site was consistently to the northwest or away from the subject site and that the highest petroleum hydrocarbons concentrations were reported in the southwest corner of the facility, approximately 150 feet south of the subject property. The report says that the groundwater monitoring well closest to the subject site is MW-1, which is located over 100 feet west of the property. Trace concentrations of toluene, ethylbenzene, xylenes, and MTBE were reportedly detected only during the November 1996 sampling event. TPH-d was detected during two sampling events in 1996 and one in 1997, with reported concentrations of 910 micrograms per a liter (ug/l), 920 ug/l, and 14,000 ug/l, respectively. No petroleum hydrocarbons are reported to have been detected in the groundwater collected from MW-1 during the last four sampling events in which it was sampled, conducted in 1998. The Clayton report concluded the review of the Arco at 5540, stating that based on the information provided, this site (Arco) has a low potential to impact the subject property. If accurate, based on the information summarized in the Clayton report, Kleinfelder would agree with the Clayton conclusion.

Additional information included in the Clayton report concerning the subject site is also included in this report in the review of DTSC record associated with the Cline property and DuPont facility (Section 4.2, Addition Agency Environmental Records). This report is included in Appendix E.

5.7. PRELIMINARY TITLE REPORT

Pacland provided a preliminary title report prepared by Placer Title Company, dated June 2, 2005, to Kleinfelder for review. The legal description of the site in the preliminary report included two exceptions for "an undivided ½ interest in all oil, gas or other hydrocarbon substances in a portion of said property..." The exceptions to the report included eight exceptions of an environmental nature. Exception 7 is a pipeline easement. The easement appears to be on the portion of land currently occupied by the Arco station. Exceptions 8, 9, 10 and 11 are natural gas pipeline easements. The report documentation quality is not adequate to determine pipeline locations in all cases. The natural gas pipelines are further discussed in Sections 3.5, 6.2 and 8.1.2. Exception 12 is a Drainage Release agreement with the County of Contra Costa. The agreement pertained to rainfall runoff from an up slope site, which was planned for development. Rainfall drainage onto the site is not expected to pose an environmental risk to the site. Exception 13 is a pipe, pipeline, culvert or ditch easement for flood control purposes. This is not expected to pose an environmental risk to the site. Exception 15 relates to monitoring wells on the site and potential remediation based on the analytical results of samples collected from the monitoring wells. The monitoring wells are further discussed in sections 3.4, 4.2, 5.6, 6.2, 6.3 and 8.1.2. A copy of the title report is included in Appendix F.

6 SITE RECONNAISSANCE

6.1. METHODOLOGY AND LIMITING CONDITIONS

Mr. Ryan Brosius, Kleinfelder Staff Environmental Scientist, conducted a site reconnaissance on September 15, 2005 to assess and photograph present site conditions. The approximate site boundaries are shown on Plate 2, "Site Map", and color photographs of the site are presented on Plates 3 and 4 (Appendix A). The site conditions discussed below are limited to readily apparent environmental conditions observed.

6.2. GENERAL SITE SETTING

The site is located northeast of the corner of Main Street and Bridgehead Road in Oakley, California. The subject site is approximately 76-acres, and includes an undeveloped piece of land, being used for vineyard. The site is located in an area of industrial, residential, and commercial land use.

The subject site was in use as a grape vineyard at the time of Kleinfelder's site reconnaissance. An irrigation well, two groundwater monitoring wells (MW-59 and MW-60) and one piezometer (PZ-17) were observed on the southwest portion of the site. No leaking, staining or stressed vegetation was associated with any of the wells. A second piezometer (PZ-36) was observed located in the southeast portion of the site. A pump and well were observed in the south central portion of the site. No leaking, staining, or stressed vegetation was noted in association with the well. Standpipes were noted in the western portion of the site. A PG&E gas pipeline marker was noted on the northwest border of the site, and flagging for gas pipelines was noted throughout the western portion of the site. Two storm drain vaults and a water main marker were noted in the northeast portion of the site. Pole-mounted transformers and storm drains were noted offsite along the southern site border.

North of the site is the Burlington Northern and Santa Fe Railroad, beyond which is the DuPont facility, a PG&E station, and additional vineyards. South of the site is Main Street (Highway 4) beyond which is mixed commercial and residential. East of the site is the railroad and agricultural land. West of the site is an Arco gas station, Bridgehead

Road, beyond which are gas stations (Chevron and Shell), a hotel, and a mobile home park.

6.3. SITE OBSERVATIONS

Site observations are included in the table below.

TABLE 11
SITE OBSERVATIONS

General Observations	Remarks	Observed	Not Observed
Current Use	Grape vineyard	X	
Past Use	Agricultural		X
Structures	None observed		X
Terrain	Level	X	
Interior and exterior observations or environmental conditions that may involve the use, storage, disposal or generation of hazardous substances or petroleum products.		**Observed**	**Not Observed**
Aboveground storage tank (AST)			X
Asbestos building materials and lead paint			X
Below grade vaults	Several vaults, located in the northeast corner of the site associated with storm drains	X	
Burned or buried debris			X
Chemical storage or agricultural chemical mixing areas			X
Discolored soil or water			X
Drains and piping	Concrete standpipes were noted in the western portion of the site.	X	
Drums			X
Electrical equipment (Polychlorinated biphenyls [PCBs])	Pole-mounted transformers are located offsite along the southern border of the site.		X
Fill dirt from an unknown source.			X
Hazardous chemical and petroleum products in connection with known use.			X
Hazardous chemical and petroleum products in connection with unknown use.			X

PRIVILEGED & CONFIDENTIAL
ATTORNEY CLIENT COMMUNICATION
ATTORNEY WORK PRODUCT

TABLE 11 (Continued)
SITE OBSERVATIONS

Interior and exterior observations or environmental conditions that may involve the use, storage, disposal or generation of hazardous substances or petroleum products.		**Observed**	**Not Observed**
Hazardous Waste Storage			X
Heating and Cooling System			X
Industrial waste treatment equipment			X
Loading and unloading areas			X
Odors			X
Pits, Ponds, or Lagoons			X
Pools of Liquid			X
Process waste water			X
Raw material storage or chemical storage areas			X
Sanitary System (Sewer)			X
Septic system (Tank and leach fields)			X
Soil piles			X
Solid Waste			X
Stained pavement or concrete			X
Stains or corrosion (interior)			X
Storm basins/catch			X
Storm drains	Strom drains are located offsite along the southern site boundary.		X
Stressed vegetation			X
Sumps & clarifiers			X
Surface water			X
Underground storage tanks			X
Unidentified substance containers			X
Waste Water			X
Water supplies (potable and process)	An irrigation well located in the southwest portion of the site, and a pump and well are located in the south central portion of the site.	X	X
Wells (irrigation, monitoring, or domestic)	An irrigation well, two groundwater monitoring wells (MW-59 and MW-60) and one piezometer (PZ-17) were observed on the southwest portion of the site. A second piezometer (PZ-36) was observed located in the southeast portion of the site. A pump and well were observed in the south central portion of the site	X	
Wells (dry)			X
Wells (Oil and Gas)			X

6.4. BUSINESS ENVIRONMENTAL RISK CONSIDERATIONS

Kleinfelder also addressed the following Business Environmental Risk Considerations outlined in Wal-Mart's *Phase I Environmental Site Assessment and Report Requirements* dated October 1, 2004:

6.4.1. Asbestos Containing Materials

No structures were noted onsite. However, as noted previously, the subject site has historically been used for agricultural purposes. On properties with a history of agricultural use, underground pipelines may exist. It was common for said pipelines to contain asbestos (e.g. "Transite" pipe).

6.4.2. Radon

Radon is a natural-occurring radioactive gas that comes from the breakdown (radioactive decay) of uranium. Radon can be found in high concentrations in soils and rocks containing uranium, granite, shale and phosphate. In outdoor air, radon is diluted to such low concentrations that it is usually not considered a health risk. However, in an enclosed space such as a poorly ventilated basement, radon can accumulate to elevated levels, which can increase the risk of developing lung cancer. The EPA Action Level for radon is 4 picoCuries per liter (Pci/L) of air.

According to the EDR report one site was tested within the zip code of the property (95461) and did not return a result greater than 4 Pci/L. The EDR report also reported property tests conducted within Contra Costa County at an average activity of 0.760 Pci/L (first floor) and 0.525 Pci/L (basement). Because only limited tests were conducted, this information may not be representative of specific on-site conditions at the subject property. However, radon is not currently expected to pose an adverse impact on the subject site.

6.4.3. Lead in Drinking Water

According to the EDR report, there are five water wells located within a 1-mile radius of the subject site. Monitoring data did not reveal detectable lead in any of the wells. It is also Kleinfelder's understanding that the site will likely be connected to city sewer and water for the future retail development. Lead in drinking water is not currently expected to pose an adverse impact on the site.

6.4.4. High Voltage Powerlines

No power lines were noted trending through the subject site.

6.4.5. Wetlands Analysis

Pacland provided Kleinfelder a prior report prepared by The Huffman-Broadway Group, Inc, San Rafael, CA and entitled "Preliminary Wetlands Analysis for the Proposed Retail #94098, Bridgehead Road and Main Street, Oakley, Contra Costa County, California, and dated October 3, 2005". The boundaries of the Huffman-Broadway Group investigation was 76.4 acres and included the same project boundaries included in Kleinfelder's assessment. This report is included in Appendix E. In summary:

Robert Perrera of HBG conducted a preliminary review of the study area boundary on the morning of August 15, 2005. Although a detailed wetland delineation was not performed, existing land forms, vegetation, hydrogeology, and soil conditions were studied to identify areas that would likely contain wetland and aquatic habitats. The evaluation considered the methodology currently in use by the Army Corps of Engineers, published Corps regulatory guidance letters, and San Francisco District regulatory policy.

Geographically, the study area boundary is positioned within the town of Oakley. It is a 76.4-acre parcel bound by Bridgehead Road to the west, a railroad to the north, and east and Main Street (Highway 4) to the south. The majority of the project site is farmed and consists of cultivated vineyards. Dominant land features include maintained dirt roads and gradual rolling hills sloping from 0 to 4 percent. One storm drain drop structure was located on the northwest boundary adjacent to the railroad tracks.

The preliminary evaluation analyzed the study area boundary for aquatic habitat considered wetlands or waters pursuant to the 1987 "Corps Wetland Delineation Manual" (1987 Manual). Pursuant to the 1987 Manual, key criteria for determining the presence of wetlands are: (a) the presence of inundated or saturated soil conditions resulting from permanent or periodic inundated by groundwater surface water; and (b) a prevalence of vegetation typically definition is the consideration of three environmental parameters: hydrology, soil, and vegetation. Positive wetland indicators of all three parameters are normally present in wetlands. The combined use of indicators of all three parameters enhances the technical accuracy, consistency, and credibility of wetland determinations. For this reason, each of the parameters is required to be present according to the 1987 Manual.

Additionally, the preliminary evaluation considered aquatic habitats other than wetlands that are also considered to be waters of the United States. Identification of aquatic habitatas other than wetlands are defined in Corps regulations (33 CFR § 328.4 (a)(b) and (c)):

(a) *Territorial Seas.* The limit of jurisdiction in the territorial seas is measured from the baseline in a seaward direction a distance of three nautical miles.

(b) *Tidal Waters of the United States.* The landward limited jurisdiction in tidal waters:

  (1) Extends to the high tide line, or

  (2) When adjacent non-tidal waters of the United States are present, the jurisdiction extends to the limits identified in (c) below.

(c) *Non-Tidal Waters of the United States.* The limits of jurisdiction in non-tidal waters:

  (1) In the absence of adjacent wetlands, the jurisdiction extends to the ordinary high water mark, or

  (2) When adjacent wetlands are present, the jurisdiction extends beyond the ordinary high water mark

  (3) to the limit of the adjacent wetlands.

  (4) When the water of the United States consists only of wetlands, the jurisdiction extends to the limit

  (5) of the wetlands.

A December 2003 aerial photograph of the site was obtained from AirPhoto USA. The digital orthophoto was brought into GIS software and the study area boundary was superimposed onto the aerial photo. The absences or presence of wetland vegetation, wetland hydrology, and hydric soil field indicators was recorded at three sample point locations. The sample point locations were memorialized as point features using a hand-held Trimble Pathfinder global positioning system (GPS) unit with sub-meter accuracy and also overlaid on the aerial photograph (Attachment 1).

No wetlands or waters that would be subject to the jurisdiction of the Corps were observed within the study area boundary during the August 15, 2005 site visit. Vegetation was characterized by cultivated vineyards, Italian ryegrass (lolium perenne), wild radish (raphanus sativa), yellow star-thistle (centaurea solstitialis), bridge's gilia (gilia leptalea), flowering saltbrush (atriplex canescens), willow (salix spp.), and eucalyptus. No secondary or primary hydrologic indicators or hydric soil indicators was observed. The upper 15 inches of the soil was characterized as well drained with a matrix color ranging from 10YR 5/2 to 10YR 4/2 with no redoximorphic features. Soil texture throughout the study area boundary was characterized as a loamy sand.

6.4.6. Other Considerations

Based on our site visits, current land use and review of pertinent site records, cultural / historical / archeological and ecological / endangered species / wildlife resources not do appear to be present at the site. If the client has specific concerns about the potential presence of such resources, then further evaluation should be performed.

Because no structures are present on site, the following Business Environment Risk Considerations do not apply and are therefore not addressed in this report:

- Lead-based paint,
- Regulatory compliance,
- Industrial hygiene,
- Health and safety, and
- Indoor air quality.

7 INTERVIEWS

Kleinfelder attempted to contact key site managers to obtain current and historical environmental information concerning the subject site. Key site managers may include current or past owners of the site, managers, or current occupants on site. Interviews were limited, to a maximum of two key site managers. No key site manager was provided to Kleinfelder for this assessment.

Local government officials were interviewed to obtain further information about environmental enforcement actions pending or ongoing at the site and adjacent facilities, or relevant permits (e.g. building, air quality, well abandonment, etc.) for the site and adjacent facilities. Copies of telephone conversation records included in Appendix D and summaries of the discussions are included in Chapter 4 of this report. The following sections highlight environmental conditions revealed during the interviews.

7.1. INTERVIEW WITH OWNER/MANAGER

An owner/manager contact was not provided to Kleinfelder for this assessment. An interview was conducted with Mr. Fed Cline (property owner), on November 3, 2005. According to Mr. Cine he had no knowledge of any underground storage tanks onsite or buried debris onsite. Mr. Cline stated that he has owned the property since 1999 and started leasing the property in 1985 from Dupont. According to Mr. Cine Dupont used the property as a buffer from their facility. The property has been used as an almond orchard in the past and is presently being used as a vineyard. According to Mr. Cline the property has been used for agricultural purposes since 1973. Mr. Cline stated that sulfur has been used on the property in the last three years and Roundup was used in the past. Mr. Cline stated that approximately nine years ago a drainage pipe was installed through the eastern portion of the property. The pipe is trending north/south and is connected to the storm-water drains along Main Street to the south of the property and trends north offsite. According to Mr. Cline the fenced off pump located along Main Street is a lateral booster pump for the Contra Costa water district supply, used to boost water pressure and a well is not associated with the pump.

7.2. INTERVIEW WITH OCCUPANTS

No occupants were interviewed at the time of Kleinfelder's site reconnaissance.

7.3. INTERVIEWS WITH LOCAL GOVERNMENT OFFICIALS

City of Oakley Planning Department was contacted on September 8, 2005. According to the clerk, the site is zoned as HI (Heavy Industrial).

7.4. INTERVIEW WITH CLIENT/OTHERS

On October 11, 2005, Kleinfelder interviewed Mr. Dean Wright of DTSC. Mr. Wright is the Project Manager for DTSC of the DuPont case. Mr. Wright was asked about the status of the Cline property. Mr. Wright replied that DTSC was prepared to remove the Cline property from the Facility A status boundary associated with the DuPont facility. He stated that this process was in the early stages, first requiring time for public commentary on the proposed removal.

8 EVALUATIONS

Kleinfelder performed this ESA of the subject site in conformance with the scope and limitations of ASTM Practice E1527 and *Wal-Mart's Phase I Environmental Site Assessment and Report Requirements*, dated October 2004. In summary, Kleinfelder's assessment revealed the following information about the subject site:

8.1. FINDINGS

The following sections describe Kleinfelder's findings and provide general background information about the site. Findings include recognized environmental conditions, historically recognized environmental conditions, and deminimus quantities, as applicable to the subject site. Business environmental risk issues are discussed in Section 8.3, Deviations. In summary:

8.1.1. Background Information

Historical aerial photographs and topographic maps reveal that the site has been used for agricultural purposes since at least 1939. The subject site has been owned by the Dupont facility since 1956, and the site was sold to Cline Cellars around 2000. The subject site is currently a grape vineyard.

8.1.2. Onsite Findings

1. Pesticides and fertilizers have likely been applied to the site. Environmentally persistent concentrations of these compounds may still be present in the shallow soil.

2. Concrete standpipes were noted in the western portion of the site. On properties with a history of agricultural use, many underground pipelines may exist. It was common for said pipelines to contain asbestos (e.g. "Transite" pipe). Subsurface exploration is not a part of a typical Phase I Environmental Site Assessment scope of work. In the event that any subsurface structures are encountered during site development or excavation on site, care should be exercised in determining whether or not the subsurface structures contain asbestos. If they

contain asbestos, they should be removed, handled, transported, and disposed of in accordance with applicable local, state, and federal laws and regulations. Additionally, if suspect materials are encountered, the signatories of this report should be notified.

3. An irrigation well was observed on the southwest portion of the site. A pump and well were also observed in the south central portion of the site. No soil staining was noted on the ground surface surrounding the pumps or wells. If the wells are intended for future use, they should be tested for suitability. If the wells are to be removed, Kleinfelder recommends that the wells be abandoned in accordance with local, state and federal regulations.

4. Two groundwater-monitoring wells (MW-59 and MW-60) and one piezometer (PZ-17) were observed on the southwest portion of the site. A second piezometer (PZ-36) was observed located in the southeast portion of the site. The monitoring wells were installed on the property for the purpose of collecting background data. If the wells are to be removed, Kleinfelder recommends that the wells be abandoned in accordance with local, state and federal regulations.

5. A water main marker is located in the northeastern portion of the subject site along the railroad tracks.

6. Several vaults, located in the northeast corner of the site are associated with storm drains. Storm drains can be conduits to groundwater. Kleinfelder did not reveal incidences of releases/ spills of hazardous substances associated with the storm drain system as part of this assessment. However, it is possible that undocumented releases of hazardous substances have occurred in the past

7. A PG&E gas pipeline marker was noted on the northwest border of the site and flagging for gas pipelines was noted throughout the western portion of the site. PG&E pipelines would not usually be expected to adversely impact the subject site unless leaks occurred and were not addressed by PG&E. However evaluation of natural gas pipeline hazards (such as explosion hazards) is beyond the scope of this report.

8.1.3. Off-Site Findings

- Storm drains and pole-mounted transformers were noted along the southern border offsite from the subject site.

- Mello's Sheet Metal, located at 1242 Main Street, adjacent to the south of the site appears on the UST and Contra Costa Co. Site List databases. No violations were found for the site.; it does not appear that this facility poses an environmental concern to the site.

- Palex, located at 1315 Main Street, adjacent to the south of the site appears on the HAZNET, Contra Costa Co. Site List, and CA WDS databases. The facility appears on the HAZNET database due to liquids with halogenated organic compounds >1000mg/l, aqueous solutions with less than 10% total organic residues, and unspecified oil-containing wastes which are disposed of at a transfer station. The facility appears on the CA WDS database due to it containing a waste discharge system. No violations were found for the site; it does not appear that this facility poses an environmental concern to the site.

- Shell (Antioch Shell), located at 5545 Bridgehead Road, adjacent to the west of the site appears on the UST, HAZNET, and SWEEPS UST databases. The facility appears on the HAZNET database due to empty containers less than 30 gallons, which are disposed of at a recycler. No violations were found for the site; it does not appear that this facility poses an environmental concern to the site.

- Bridgehead Inc. (ARCO Products #6301), located at 5540 Bridgehead Road, adjacent to the southwest corner of the site appears on the HAZNET, LUST, Cortese, CHMIRS, and Contra Costa Co. Site List databases. The facility appears on the HAZNET database due to aqueous solutions with less than 10% total organic residues, which are disposed of at a recycler. The facility appears on the CHMIRS database due to a release at the site caused by a hose at the service station that came loose and spilled 10-gallons of gasoline on October 13, 2001. The facility appears on the LUST and Cortese databases due to a leaking underground storage tank. The chemical involved is gasoline, which reportedly affected the aquifer. The leak was discovered on March 23, 1993 during tank closure. MTBE was tested for and detected at 43 parts per billion. The case was closed on June 20, 2003

- Delta Scrap & Salvage, located at 1371 Main Street, adjacent to the south of the site appears on the Contra Costa Co. Site List. Delta Scrap & Salvage has been used to crush and recycle vehicles. Our experience with environmental investigations of auto salvage businesses in this area, and their reputations for having poor waste handling practices, both indicate the potential for a release of petroleum products from the Delta Scrap & Salvage facility.

- A PG&E gas distribution facility at 5900 Bridgehead Road, is located adjacent to the site to the northwest. A recent investigation of this site revealed significant concentrations of petroleum hydrocarbons in groundwater.

- G E Sales, located at 5801 Bridgehead Road, adjacent to the west of the site appears on the Contra Costa Co. Site List. No violations were found for the site; it does not appear that this facility poses an environmental concern to the site.

- Chevron #9-3801, located at 5433 Neroly Road, approximately 500 feet southwest of the site appears on the LUST, Cortese databases. The facility appears on the LUST and Cortese databases due to a leaking underground storage tank. The chemical is gasoline, which reportedly affected the aquifer. MTBE was tested for and detected at 4.2 parts per billion. The case was closed on May 29, 2002. Based on this status the facility does not appear to pose an environmental concern to the site. If contamination attributable to Chevron #9-3801 is discovered on site, the expense and/or liability associated with any necessary investigation or remediation would typically fall upon the responsible party (i.e. Chevron #9-3801).

- Dupont Antioch Works (Dupont Chemical Co.), located at 6000 Bridgehead Road, approximately 500 feet north of the site appears on the LUST, Cortese, CA FID UST, SLIC, and RCRA-TSDF databases. The facility appears on the CA FID UST database due to it being an active underground storage tank location. The facility appears on the LUST and Cortese database due to the release of gasoline from an underground storage tank, which affected the aquifer. The leak was discovered on August 21, 1986 during tank closure. Remedial action is currently underway at the site. The facility appears on the SLIC database due to the release of SUB004, SUB005, SUB015, SUB030, and SUB031, which is under a remediation plan.

- Waste Fiber Recovery, located at Hwy 4, approximately 1300 feet west of the site appears on the SLIC and Contra Costa Co. Site List. The facility appears on the SLIC database due to the release of 128, and PET. Based on the distance from the subject site the facility does not appear to pose an environmental concern to the site.

8.2. CONCLUSIONS

We have performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E 1527-00 and *Wal-Mart's Phase I Environmental Site Assessment and Report Requirements*, dated October 2004 of the approximately 76-acre property located on the northeast corner of Main Street and Bridgehead Road in Oakley, California. Any exceptions to, or deletions from this practice are described in Chapter 8.3 of this report. The following RECs at the site have been identified in our assessment:

1. Due to the historical agricultural use of the site, pesticides and fertilizers have likely been applied to the site. The subject site has been included in several assessments conducted in the past in which soils samples were collected and analyzed for organochlorine pesticides. Several pesticides were detected in those soil samples, however reported concentrations were below residential PRGs.

2. A DuPont facility located at 6000 Bridgehead Road (DuPont) adjoins the subject property to the north, and was involved in the manufacture of chemicals including tetraethyl lead, Freon, and TiO_2 from about 1957 until 1998. Characterization of soil and groundwater conditions, as well as remediation efforts at this facility began in the 1980s and continues through the present time. A number of contaminants have been detected in soil and groundwater at the DuPont facility, and three groundwater contaminant plumes have been defined. The southeastern edge of one of the plumes, designated Plume 3, has been mapped across the northwestern corner of the non-subject site portion of the Cline property (north of the railroad). Constituents of concern associated with Plume 3 include PCE and related daughter products.

Environmental sampling of the subject property conducted in 1999 and 2002, as well as continued groundwater monitoring and sampling conducted by DuPont indicate that the subject property has not been adversely impacted by its proximity to DuPont. The groundwater contaminant plumes below the DuPont facility appear to be well defined, and soil and groundwater characterization and remediation continue under DTSC oversight.

3. Delta Scrap & Salvage, at 1371 Main Street, is located adjacent to the south of the site. Delta Scrap & Salvage has been used to crush and recycle vehicles. Our experience with environmental investigations of auto salvage businesses in this area, and their reputations for having poor waste handling practices, both indicate the potential for a release of petroleum products from the Delta Scrap & Salvage facility.

4. A PG&E gas distribution facility at 5900 Bridgehead Road is located adjacent to the site to the northwest. A recent investigation of this site revealed significant concentrations of petroleum hydrocarbons in groundwater. Based on the expected groundwater gradient directed to the north, we would not expect that the subject site has been impacted by the release.

5. Bridgehead Inc. (Arco Products #6031) located at 5540 Bridgehead Road, adjacent to the southwest of the site, appears on the LUST and Cortese database due to a leaking UST the affected the aquifer. Groundwater monitoring was conducted at the site from 1996 through 2000, during which the lateral extent of the groundwater plume was defined and a pattern of decreasing petroleum hydrocarbons was established. The case was closed by the RWQCB. Groundwater flow at the site was consistently to the northwest or away from the subject site and that the highest petroleum hydrocarbons concentrations were reported in the southwest corner of the facility, approximately 150 feet south of the subject site. The facility had groundwater monitoring well (MW-1), located approximately 100 feet west of the subject site. Trace concentrations of toluene, ethylbenzene, xylenes, and MTBE were detected in MW-1, only during the November 1996 sampling event. TPH-d was detected during two sampling events in 1996 and one in 1997, with reported concentrations of 910 micrograms per a liter (ug/l), 920 ug/l, and 14,000 ug/l, respectively. No petroleum hydrocarbons are reported to have been detected in the groundwater collected from MW-1 during the last four sampling events at the facility,

conducted in 1998. It does not appear that the subject site has been impacted by the release.

8.3. DEVIATIONS

No significant deviations were made from the ASTM E 1527-00 practice. No other "non-scope" considerations, such as regulatory compliance, industrial hygiene, health and safety, and indoor air quality were considered for this report.

9 REFERENCES

1. Environmental Data Resources, Bridgehead Road and Main Street, Bridgehead Road/Main Street, Oakley, CA 94561. Inquiry # 1502948.2s, September 2, 2005.

2. Environmental Data Resources, Bridgehead Road and Main Street, Bridgehead Road/Main Street, Oakley, CA 94561. Sanborn Map Report, Inquiry # 1502948.12s, September 2, 2005.

3. Environmental Data Resources, Bridgehead Road and Main Street, Bridgehead Road/Main Street, Oakley, CA 94561. Aerial Photography Service, Inquiry # 1502948-14, September 6, 2005, 2004.

4. Environmental Data Resources, Bridgehead Road and Main Street, Bridgehead Road/Main Street, Oakley, CA 94561. Historical Topographic Map Report, Inquiry # 1502948-13, September 6, 2005.

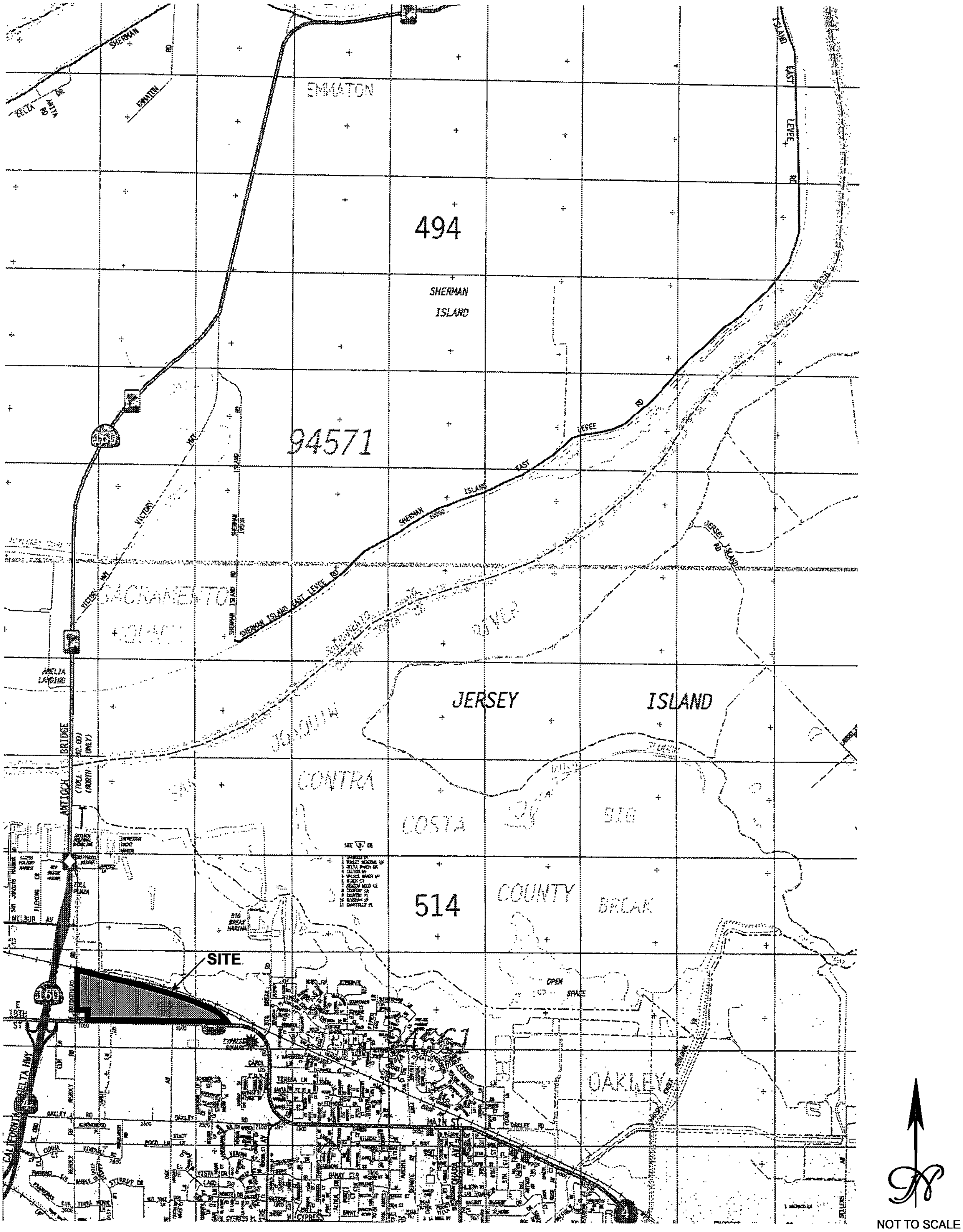
5. Munger Oil and Gas Fields Map Book, 1999.

6. Regional Geologic Map Series, San Francisco-San Jose Quadrangle, Map No. 5A, 1991 (Scale: 1 inch = 12 miles).

7. State of California, Department of Water resources, Topographical Map, Rio Vista Quadrant, 7.5 Minute Series, 1978, Scale: 1 inch = 2,000 feet.

APPENDIX A

PLATES



NOTTO SCALE

KLEINFELDER

DATE PRODUCED:9/26/2005

DATE REVISED:

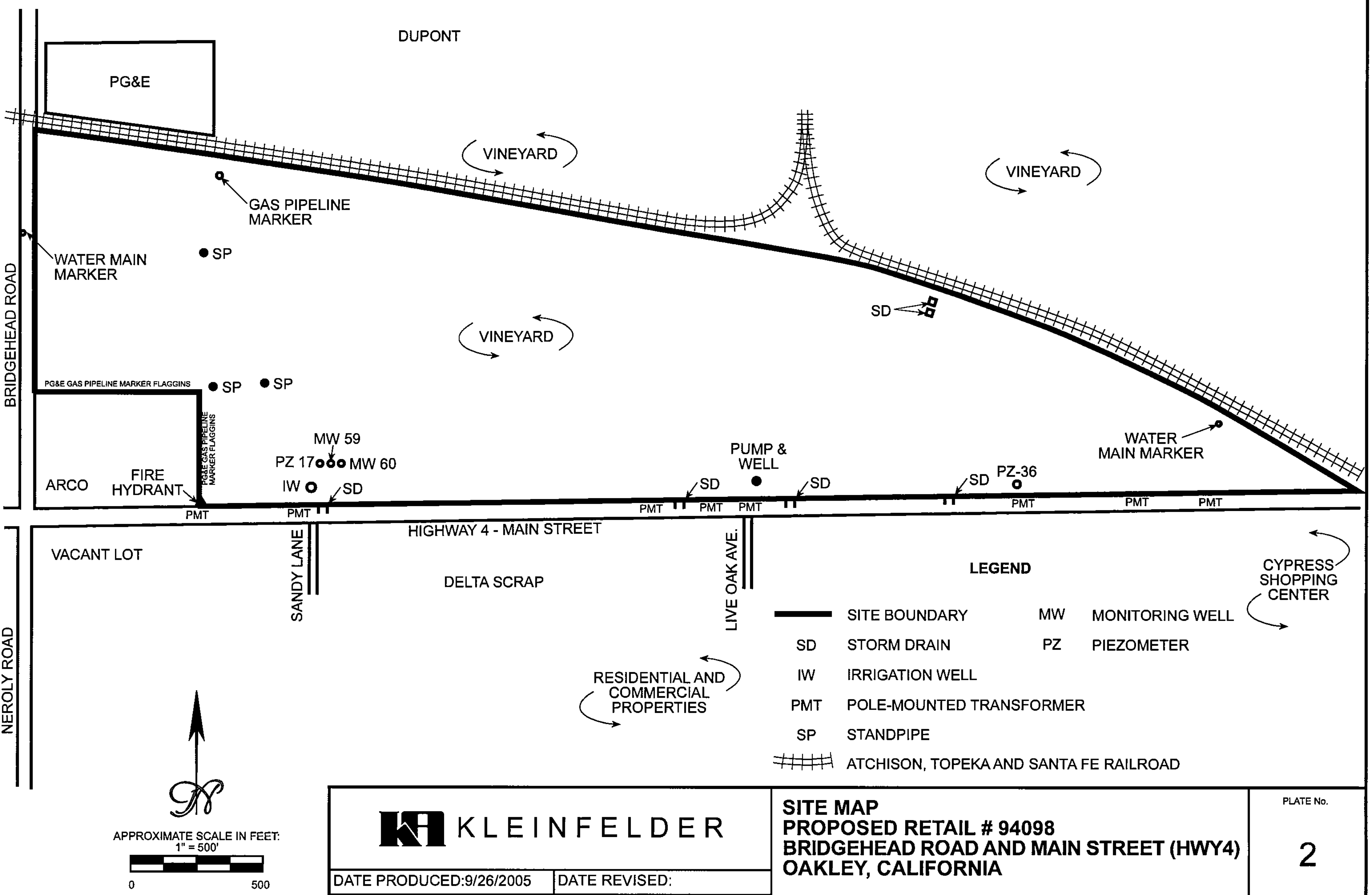
PROJ. NO.:61102.P01

FILENAME:STO5D599.FH11

SITE VICINITY MAP
PROPOSED RETAIL # 94098
BRIDGEHEAD ROAD AND MAIN STREET (HWY4)
OAKLEY, CALIFORNIA

PLATE No.

1



KLEINFELDER

DATE PRODUCED:9/26/2005
DATE REVISED:
PROJ. NO.:61102.P01
FILENAME:STO5D600.FH11

SITE MAP
PROPOSED RETAIL # 94098
BRIDGEHEAD ROAD AND MAIN STREET (HWY4)
OAKLEY, CALIFORNIA

PLATE No.
2

PHOTO 1: Looking northwest from the southeast border of the site.

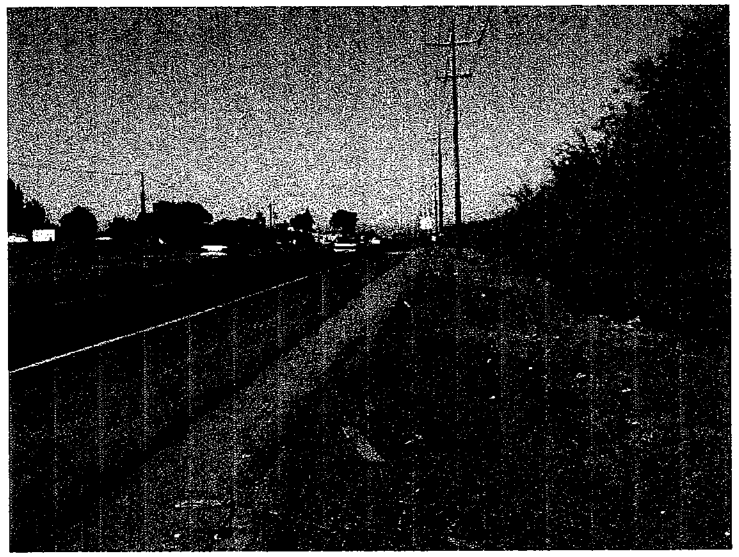


PHOTO 2: Looking west along the southern border of the site.

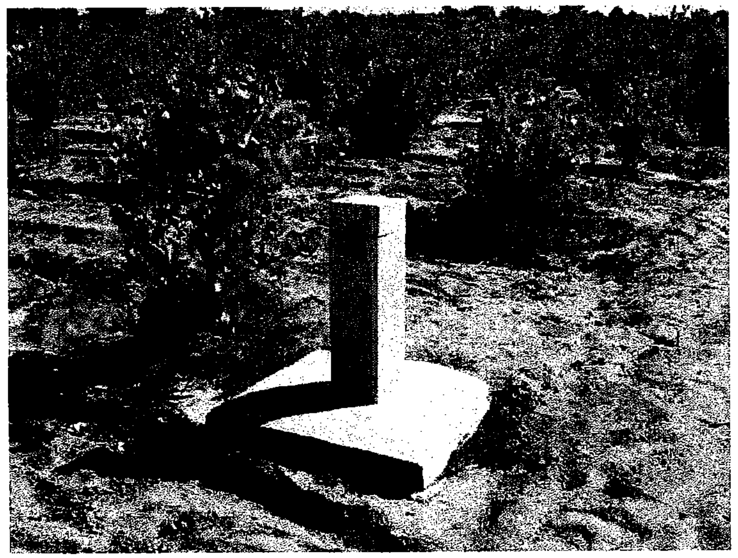


PHOTO 3: Dupont groundwater monitoring well located along the southeast portion of the site.

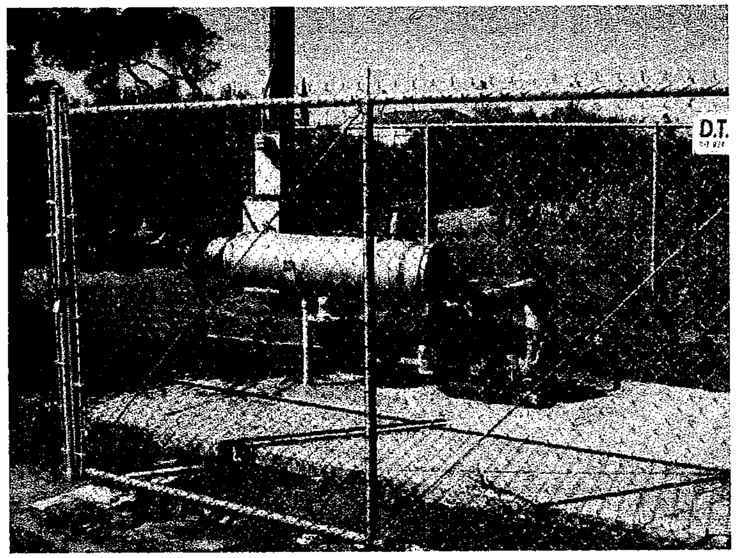


PHOTO 4: Pump and well located in the south central border of the site.

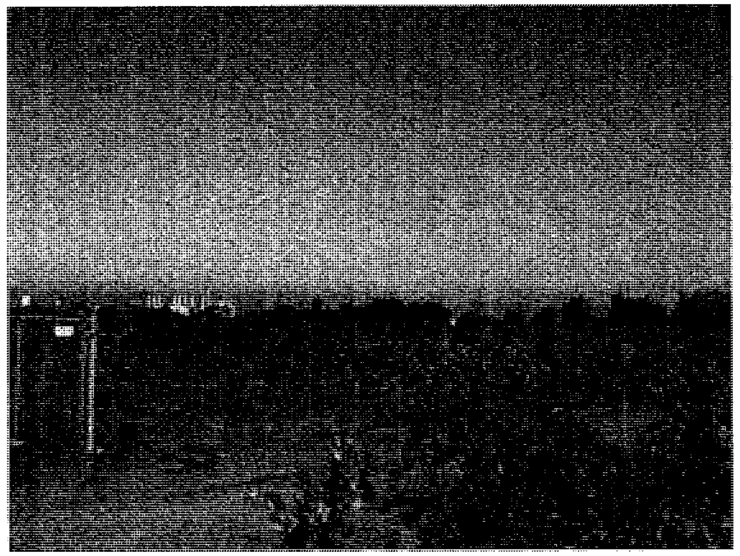


PHOTO 5: Looking northwest from the southwest portion of the site.

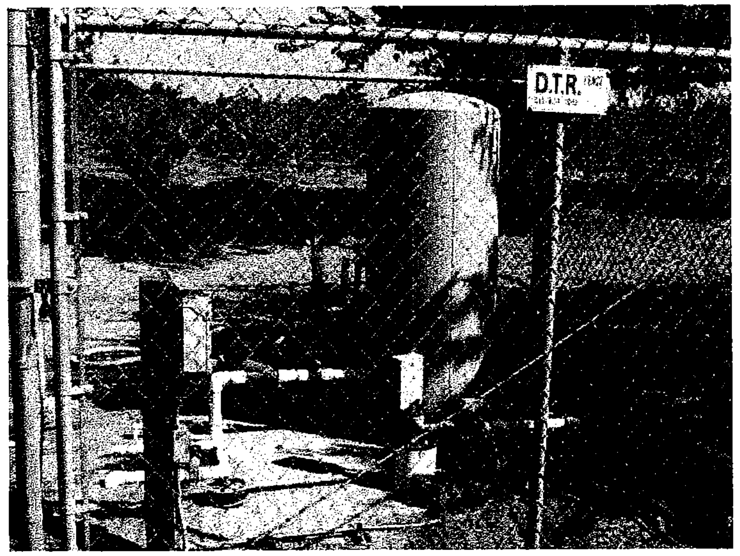


PHOTO 6: Irrigation well located in the southwest portion of the site.

PHOTO 7: Dupont groundwater monitoring wells located in the southwest portion of the site.

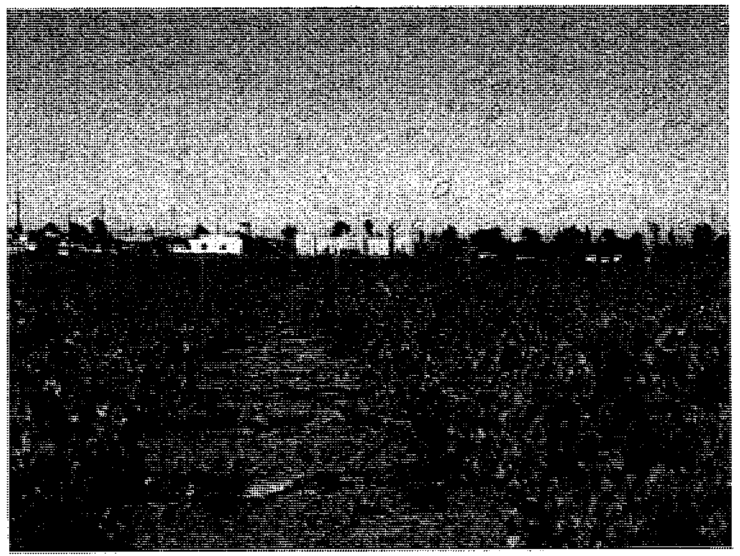


PHOTO 8: Looking west from the southwest portion of the site.

KLEINFELDER

DATE PRODUCED:9/26/2005	DATE REVISED:
PROJ. NO.:61102	FILENAME:STO5D602.FH11

SITE PHOTOGRAPHS
PROPOSED RETAIL # 94098
BRIDGEHEAD ROAD AND MAIN STREET (HWY4)
OAKLEY, CALIFORNIA

PLATE
3

PHOTO 9: Looking west from the southwest corner of the site.

PHOTO 10: Looking north from the southwest corner of the site.

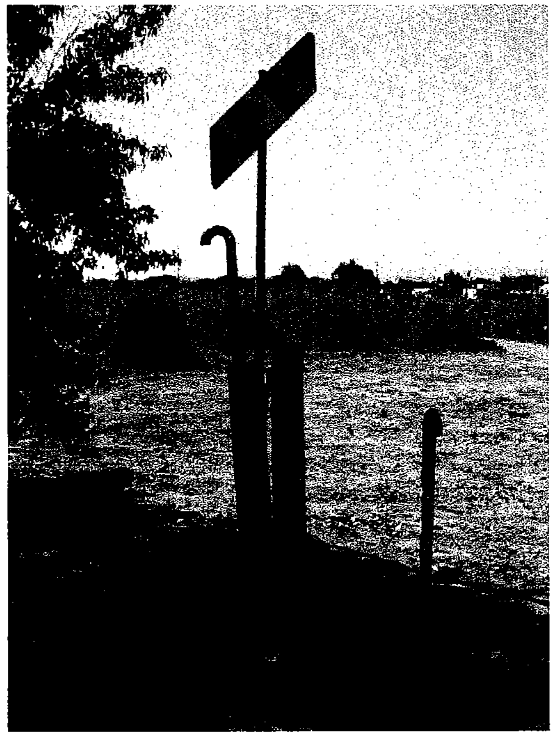


PHOTO 11: Underground gas pipeline marker located along the northwest border of the site.

PHOTO 12: Looking northwest at the PG&E facility located north of the site.

PHOTO 13: Looking east along the site border.

PHOTO 14: Storm drain vaults located along the northeast border of the site.

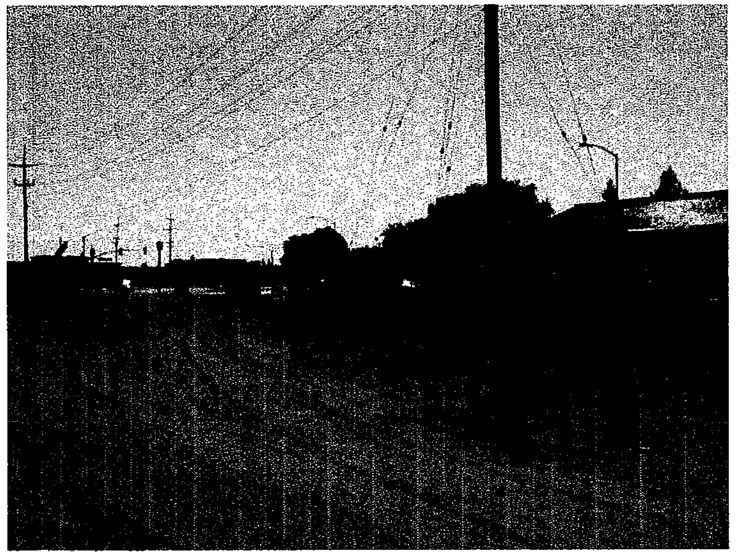


PHOTO 15: Looking east from the eastern site border.

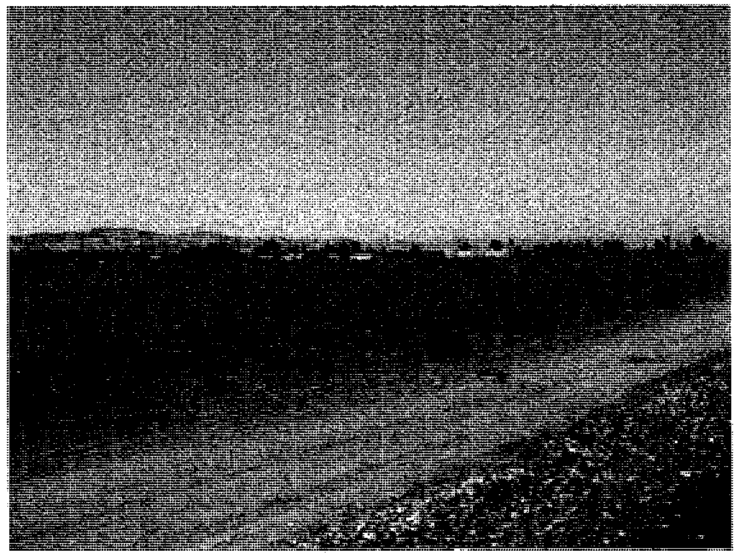


PHOTO 16: Looking southwest from the northern border of the site.

KLEINFELDER		SITE PHOTOGRAPHS PROPOSED RETAIL # 94098 BRIDGEHEAD ROAD AND MAIN STREET (HWY4) OAKLEY, CALIFORNIA	PLATE 4
DATE PRODUCED:9/26/2005	DATE REVISED:		
PROJ. NO.:61102	FILENAME:STO5D603.FH11		

KLEINFELDER

DATE PRODUCED:9/26/2005	DATE REVISED:
PROJ. NO.:61102.P01	FILENAME:STO5D601.FH11

SITE VICINITY MAP
PROPOSED RETAIL # 94098
BRIDGEHEAD ROAD AND MAIN STREET (HWY4)
OAKLEY, CALIFORNIA

PLATE No.

5

APPENDIX B

ENVIRONMENTAL DATA RESOURCES REPORT

EDR® Environmental
Data Resources Inc

The EDR Radius Map
with GeoCheck®

Bridgehead Road and Main Street
Bridgehead Road/Main Street
Oakley, CA 94561

Inquiry Number: 1502948.2s

September 02, 2005

The Standard in Environmental Risk Management Information

440 Wheelers Farms Road
Milford, Connecticut 06460

Nationwide Customer Service

Telephone:	1-800-352-0050
Fax:	1-800-231-6802
Internet:	www.edrnet.com

TABLE OF CONTENTS

SECTION **PAGE**

GEOCHECK ADDENDUM

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

Cal-Sites	Calsites Database
CHMIRS	California Hazardous Material Incident Report System
Notify 65	Proposition 65 Records
Toxic Pits	Toxic Pits Cleanup Act Sites
SWF/LF	Solid Waste Information System
CA BOND EXP. PLAN	Bond Expenditure Plan
VCP	Voluntary Cleanup Program Properties
INDIAN LUST	Leaking Underground Storage Tanks on Indian Land
INDIAN UST	Underground Storage Tanks on Indian Land
CA FID UST	Facility Inventory Database

FEDERAL ASTM SUPPLEMENTAL

CONSENT	Superfund (CERCLA) Consent Decrees
ROD	Records Of Decision
Delisted NPL	National Priority List Deletions
FINDS	Facility Index System/Facility Registry System
HMIRS	Hazardous Materials Information Reporting System
MLTS	Material Licensing Tracking System
MINES	Mines Master Index File
NPL Liens	Federal Superfund Liens
PADS	PCB Activity Database System
US ENG CONTROLS	Engineering Controls Sites List
ODI	Open Dump Inventory
DOD	Department of Defense Sites
INDIAN RESERV	Indian Reservations
UMTRA	Uranium Mill Tailings Sites
FUDS	Formerly Used Defense Sites
RAATS	RCRA Administrative Action Tracking System
TRIS	Toxic Chemical Release Inventory System
TSCA	Toxic Substances Control Act
SSTS	Section 7 Tracking Systems
FTTS INSP	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

STATE OR LOCAL ASTM SUPPLEMENTAL

AST	Aboveground Petroleum Storage Tank Facilities
CLEANERS	Cleaner Facilities
CA WDS	Waste Discharge System
DEED	Deed Restriction Listing
NFA	No Further Action Determination
WIP	Well Investigation Program Case List
EMI	Emissions Inventory Data
REF	Unconfirmed Properties Referred to Another Agency
SCH	School Property Evaluation Program
NFE	Properties Needing Further Evaluation
HAZNET	Facility and Manifest Data

EDR PROPRIETARY HISTORICAL DATABASES

Coal Gas	Former Manufactured Gas (Coal Gas) Sites

BROWNFIELDS DATABASES

US BROWNFIELDS	A Listing of Brownfields Sites

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc. (EDR). The report meets the government records search requirements of ASTM Standard Practice for Environmental Site Assessments, E 1527-00. Search distances are per ASTM standard or custom distances requested by the user.

TARGET PROPERTY INFORMATION

ADDRESS

BRIDGEHEAD ROAD/MAIN STREET
OAKLEY, CA 94561

COORDINATES

Latitude (North):	38.006300 - 38˚ 0' 22.7"
Longitude (West):	121.747200 - 121˚ 44' 49.9"
Universal Tranverse Mercator:	Zone 10
UTM X (Meters):	609988.0
UTM Y (Meters):	4207049.0
Elevation:	22 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property:	38121-A6 JERSEY ISLAND, CA
Source:	USGS 7.5 min quad index

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the ASTM E 1527-00 search radius around the target property for the following databases:

FEDERAL ASTM STANDARD

NPL	National Priority List
Proposed NPL	Proposed National Priority List Sites
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CERC-NFRAP	CERCLIS No Further Remedial Action Planned
RCRA-LQG	Resource Conservation and Recovery Act Information
RCRA-SQG	Resource Conservation and Recovery Act Information
ERNS	Emergency Response Notification System

STATE ASTM STANDARD

AWP	Annual Workplan Sites

US INST CONTROL---------- Sites with Institutional Controls
VCP--------------------------- Voluntary Cleanup Program Properties

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

FEDERAL ASTM STANDARD

CORRACTS: CORRACTS is a list of handlers with RCRA Corrective Action Activity. This report shows which nationally-defined corrective action core events have occurred for every handler that has had corrective action activity.

A review of the CORRACTS list, as provided by EDR, and dated 06/28/2005 has revealed that there are 2 CORRACTS sites within approximately 1 mile of the target property.

Lower Elevation	Address	Dist / Dir	Map ID	Page
E. I. DUPONT DE NEMOURS & CO	***6000 BRIDGEHEAD RD***	***1/4 - 1/2NNW***	***D15***	***20***
CONTRA COSTA POWER PLANT	***3201 WILBUR AVE***	***1/2 - 1 WNW***	***19***	***43***

RCRAInfo: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRAInfo replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System(RCRIS). The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month. Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month Large quantity generators generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month. Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

A review of the RCRA-TSDF list, as provided by EDR, and dated 05/20/2005 has revealed that there is 1 RCRA-TSDF site within approximately 0.5 miles of the target property.

Lower Elevation	Address	Dist / Dir	Map ID	Page
E. I. DUPONT DE NEMOURS & CO	***6000 BRIDGEHEAD RD***	***1/4 - 1/2NNW***	***D15***	***20***

STATE ASTM STANDARD

CORTESE: This database identifies public drinking water wells with detectable levels of contamination, hazardous substance sites selected for remedial action, sites with known toxic material identified through the abandoned site assessment program, sites with USTs having a reportable release and all solid waste disposal facilities from which there is known migration. The source is the California Environmental Protection Agency/Office of Emergency Information.

A review of the Cortese list, as provided by EDR, has revealed that there are 3 Cortese sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
BRIDGEHEAD INC	*5540 BRIDGEHEAD RD*	*1/8 - 1/4 WSW*	*B8*	*11*
CHEVRON #9-3801	*5433 NEROLY RD*	*1/4 - 1/2 SW*	*12*	*15*

Lower Elevation	Address	Dist / Dir	Map ID	Page
DU PONT ANTIOCH WORKS	*6000 BRIDGEHEAD RD*	*1/4 - 1/2 NNW*	*D13*	*17*

WMUDS/SWAT: The Waste Management Unit Database System is used for program tracking and inventory of waste management units. The source is the State Water Resources Control Board.

A review of the WMUDS/SWAT list, as provided by EDR, has revealed that there is 1 WMUDS/SWAT site within approximately 0.5 miles of the target property.

Lower Elevation	Address	Dist / Dir	Map ID	Page
ANTIOCH FACILITY	*6000 BRIDGEHEAD RD*	*1/4 - 1/2 NNW*	*D17*	*37*

LUST: The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the State Water Resources Control Board Leaking Underground Storage Tank Information System.

A review of the LUST list, as provided by EDR, and dated 07/11/2005 has revealed that there are 3 LUST sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
BRIDGEHEAD INC	*5540 BRIDGEHEAD RD*	*1/8 - 1/4 WSW*	*B8*	*11*
CHEVRON #9-3801	*5433 NEROLY RD*	*1/4 - 1/2 SW*	*12*	*15*

Lower Elevation	Address	Dist / Dir	Map ID	Page
DU PONT ANTIOCH WORKS	*6000 BRIDGEHEAD RD*	*1/4 - 1/2 NNW*	*D13*	*17*

UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the State Water Resources Control Board's Hazardous Substance Storage Container Database.

A review of the UST list, as provided by EDR, and dated 07/11/2005 has revealed that there are 3 UST sites within approximately 0.25 miles of the target property.

EXECUTIVE SUMMARY

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
MELLO'S SHEET METAL	1241 MAIN ST	1/8 - 1/4 SE	A1	6
ANTIOCH SHELL	5545 BRIDGEHEAD RD	1/8 - 1/4 WSW	B5	9
ARCO PRODUCTS #6301	5540 BRIDGEHEAD RD	1/8 - 1/4 WSW	B7	11

HIST UST: Historical UST Registered Database.

A review of the HIST UST list, as provided by EDR, and dated 10/15/1990 has revealed that there is 1 HIST UST site within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
DRIFTWOOD MARINA	BRIDGEHEAD ROAD	1/8 - 1/4 WSW	B4	8

SWEEPS: Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1980?s. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

A review of the SWEEPS UST list, as provided by EDR, and dated 06/01/1994 has revealed that there is 1 SWEEPS UST site within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
SHELL	***5545 BRIDGEHEAD RD***	***1/8 - 1/4 WSW***	***B6***	***9***

STATE OR LOCAL ASTM SUPPLEMENTAL

CA SLIC: SLIC Region comes from the California Regional Water Quality Control Board.

A review of the SLIC list, as provided by EDR, and dated 07/11/2005 has revealed that there are 3 SLIC sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
WASTE FIBER RECOVERY	***HWY 4***	***1/4 - 1/2 W***	***18***	***42***

Lower Elevation	Address	Dist / Dir	Map ID	Page
DUPONT CHEMICAL CO., ANTIOCH W	6000 BRIDGEHEAD ROAD	1/4 - 1/2 NNW	D14	20
E I DUPONT DE NEMOURS & COMPAN	***6000 BRIDGEHEAD RD***	***1/4 - 1/2 NNW***	***D16***	***34***

SL: Lists includes sites from the Underground Tank Program, Hazardous Waste Generator Program & Business Plan 12185 Program

A review of the CONTRA COSTA CO. SITE LIST list, as provided by EDR, has revealed that there are 6 CONTRA COSTA CO. SITE LIST sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
MELLO'S SHEET METAL	1241 MAIN ST	1/8 - 1/4 SE	A2	6
PALEX	***1315 MAIN ST***	***1/8 - 1/4 ESE***	***3***	***6***

EXECUTIVE SUMMARY

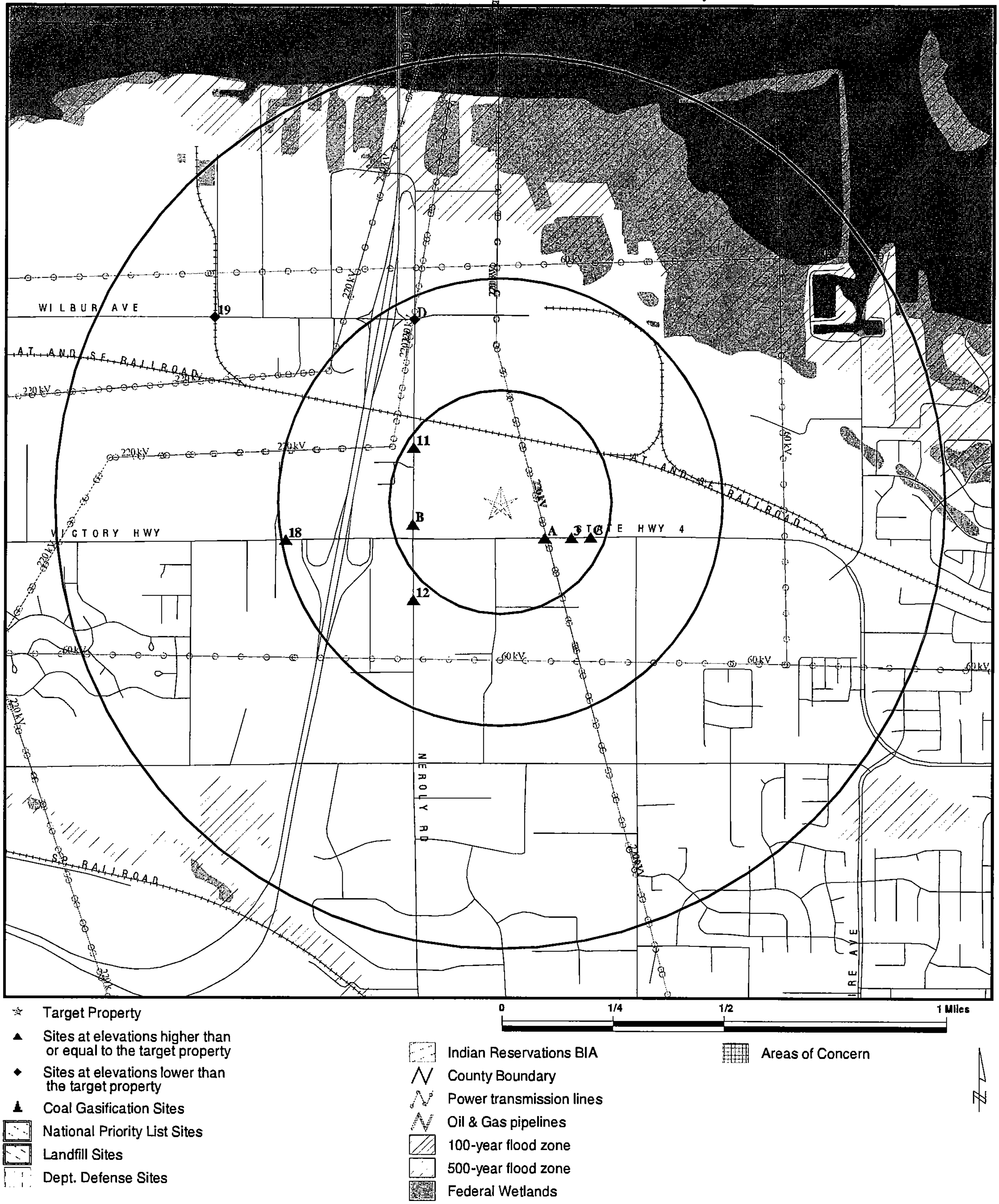
Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
BRIDGEHEAD INC	***5540 BRIDGEHEAD RD***	***1/8 - 1/4 WSW***	***B8***	***11***
DELTA SCRAP & SALVAGE	1371 MAIN ST	1/8 - 1/4 ESE	C9	14
GE SALES/DELTA SCRAP	1371 MAIN ST	1/8 - 1/4 ESE	C10	15
G E SALES	5801 BRIDGEHEAD RD	1/8 - 1/4 WNW	11	15

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped:

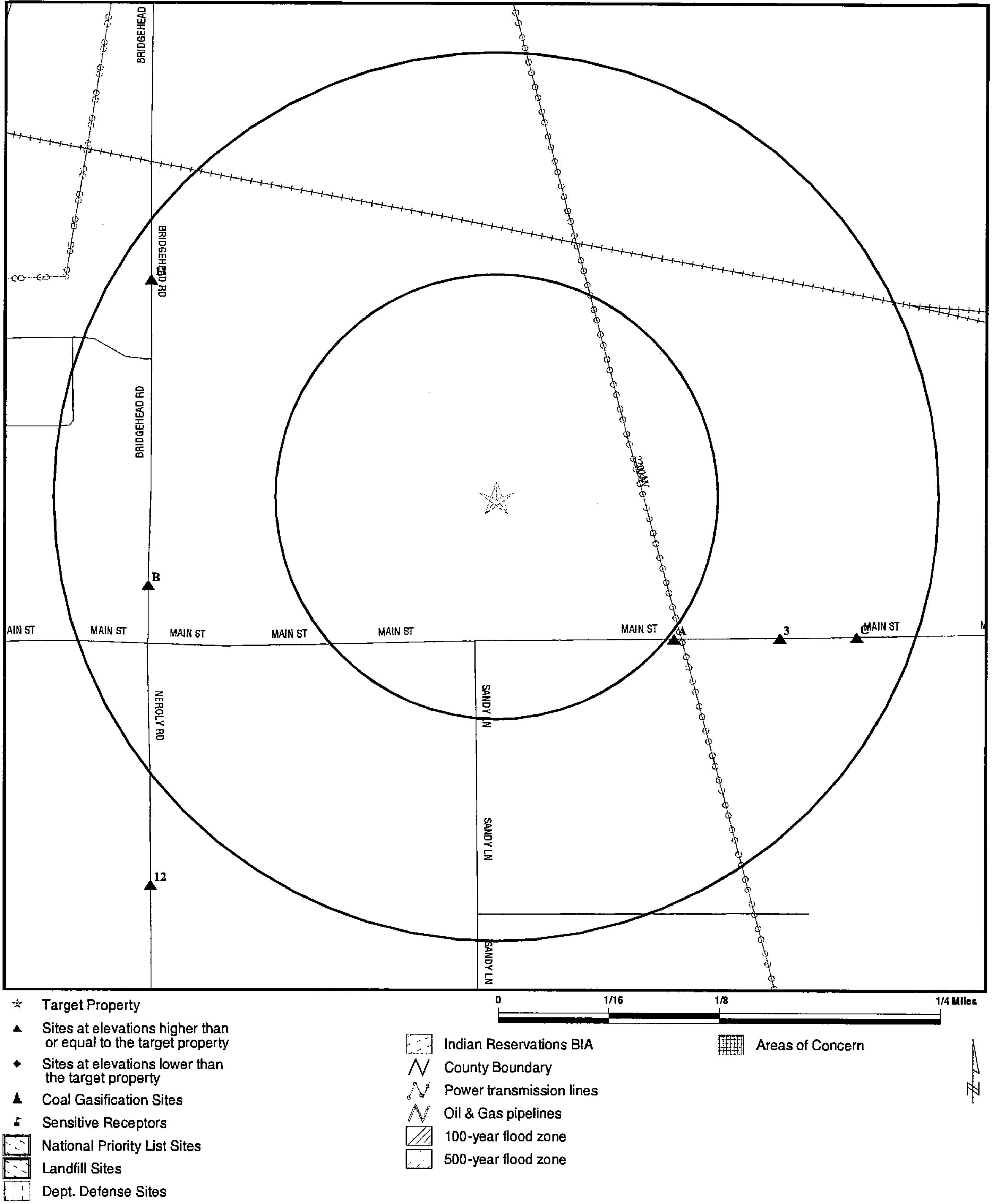
Site Name	Database(s)
SAN JOAQUIN YACHT HARBOR	SWEEPS UST
SHERMAN ISL. DEHYDRATOR-ODORAN	SWEEPS UST
DELTA DIABLO ANTIOCH PUMP STA	CHMIRS, CA FID UST, CONTRA COSTA CO. SITE LIST, SWEEPS UST
GAS MACHINE	SWEEPS UST
MELLO'S SHEET METAL	SWEEPS UST
A & A MARKET (FORMER)	LUST, Cortese, CONTRA COSTA CO. SITE LIST, SWEEPS UST
OAKLEY BUILDERS SUPPLY	SWEEPS UST
CONTRA COSTA WATER DISTRICT	SWEEPS UST
OAKLEY ONE HR CLEANERS	RCRA-SQG, FINDS, HAZNET, CLEANERS
ABANDONED DRUM/ANTIOCH	CERC-NFRAP
ANTIOCH DSPL SITE	CERC-NFRAP
DELTA DIABLO SAN DIST/ANTIOCH	UST
7-ELEVEN STORE #32787	UST
SANTA FE SERVICE STATION	HIST UST
BRIDGEHEAD TRUCK STOP	CA FID UST
ARCO FACILITY NO 06301	RCRA-SQG, FINDS, HAZNET
P G AND E DUTCH SLOUGH DEHYDRATOR	RCRA-SQG, FINDS, HAZNET
CALIFORNIA ORGANICS	RCRA-SQG, FINDS
CHEVRON STATION NO 93801	RCRA-SQG, FINDS
CARPENTER ROAD SCHOOL	SCH
CYPRESS ROAD NEW ELEMENTARY SCHOOL	SCH
CYPRESS ROAD SCHOOL	SCH
BRIDGEHEAD TRUCK STOP	CONTRA COSTA CO. SITE LIST
SWAFFORD STORAGE	CONTRA COSTA CO. SITE LIST
CHEVRON STATION #96946	CONTRA COSTA CO. SITE LIST
MCKINNEY, EMILE E	CONTRA COSTA CO. SITE LIST
LUCCHESI, ROY & RAPLH	CONTRA COSTA CO. SITE LIST
STONEBARGER RANCH	CONTRA COSTA CO. SITE LIST
LUCCHESI, GUIDO	CONTRA COSTA CO. SITE LIST
JOHNSON, ELMER	CONTRA COSTA CO. SITE LIST
BALDOCCHI, EVO	CONTRA COSTA CO. SITE LIST
WINDSWEPT LIVESTOCK CO	CONTRA COSTA CO. SITE LIST
MARQUEZ ENERGY LLC	CONTRA COSTA CO. SITE LIST
CAL TRANS OAKLEY	CONTRA COSTA CO. SITE LIST
WAPA/CC SUBSTATION #4	CONTRA COSTA CO. SITE LIST
SHOSHONE OIL CORPORATION	CONTRA COSTA CO. SITE LIST
WESTERN CONT'L NGC-KYSH-1	CONTRA COSTA CO. SITE LIST

OVERVIEW MAP - 1502948.2s - Kleinfelder, Inc.



TARGET PROPERTY:	Bridgehead Road and Main Street	CUSTOMER:	Kleinfelder, Inc.
ADDRESS:	Bridgehead Road/Main Street	CONTACT:	Ryan Brosius
CITY/STATE/ZIP:	Oakley CA 94561	INQUIRY #:	1502948.2s
LAT/LONG:	38.0063 / 121.7472	DATE:	September 02, 2005 6:14 pm

DETAIL MAP - 1502948.2s - Kleinfelder, Inc.



TARGET PROPERTY:	Bridgehead Road and Main Street	CUSTOMER:	Kleinfelder, Inc.
ADDRESS:	Bridgehead Road/Main Street	CONTACT:	Ryan Brosius
CITY/STATE/ZIP:	Oakley CA 94561	INQUIRY #:	1502948.2s
LAT/LONG:	38.0063 / 121.7472	DATE:	September 02, 2005 6:15 pm

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
FEDERAL ASTM STANDARD								
NPL		1.000	0	0	0	0	NR	0
Proposed NPL		1.000	0	0	0	0	NR	0
CERCLIS		0.500	0	0	0	NR	NR	0
CERC-NFRAP		0.250	0	0	NR	NR	NR	0
CORRACTS		1.000	0	0	1	1	NR	2
RCRA TSD		0.500	0	0	1	NR	NR	1
RCRA Lg. Quan. Gen.		0.250	0	0	NR	NR	NR	0
RCRA Sm. Quan. Gen.		0.250	0	0	NR	NR	NR	0
ERNS		TP	NR	NR	NR	NR	NR	0
STATE ASTM STANDARD								
AWP		1.000	0	0	0	0	NR	0
Cal-Sites		1.000	0	0	0	0	NR	0
CHMIRS		TP	NR	NR	NR	NR	NR	0
Cortese		0.500	0	1	2	NR	NR	3
Notify 65		1.000	0	0	0	0	NR	0
Toxic Pits		1.000	0	0	0	0	NR	0
State Landfill		0.500	0	0	0	NR	NR	0
WMUDS/SWAT		0.500	0	0	1	NR	NR	1
LUST		0.500	0	1	2	NR	NR	3
CA Bond Exp. Plan		1.000	0	0	0	0	NR	0
UST		0.250	0	3	NR	NR	NR	3
VCP		0.500	0	0	0	NR	NR	0
INDIAN LUST		0.500	0	0	0	NR	NR	0
INDIAN UST		0.250	0	0	NR	NR	NR	0
CA FID UST		0.250	0	0	NR	NR	NR	0
HIST UST		0.250	0	1	NR	NR	NR	1
SWEEPS UST		0.250	0	1	NR	NR	NR	1
FEDERAL ASTM SUPPLEMENTAL								
CONSENT		1.000	0	0	0	0	NR	0
ROD		1.000	0	0	0	0	NR	0
Delisted NPL		1.000	0	0	0	0	NR	0
FINDS		TP	NR	NR	NR	NR	NR	0
HMIRS		TP	NR	NR	NR	NR	NR	0
MLTS		TP	NR	NR	NR	NR	NR	0
MINES		0.250	0	0	NR	NR	NR	0
NPL Liens		TP	NR	NR	NR	NR	NR	0
PADS		TP	NR	NR	NR	NR	NR	0
US ENG CONTROLS		0.500	0	0	0	NR	NR	0
ODI		0.500	0	0	0	NR	NR	0
DOD		1.000	0	0	0	0	NR	0
INDIAN RESERV		1.000	0	0	0	0	NR	0
UMTRA		0.500	0	0	0	NR	NR	0
FUDS		1.000	0	0	0	0	NR	0

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
RAATS		TP	NR	NR	NR	NR	NR	0
TRIS		TP	NR	NR	NR	NR	NR	0
TSCA		TP	NR	NR	NR	NR	NR	0
SSTS		TP	NR	NR	NR	NR	NR	0
FTTS		TP	NR	NR	NR	NR	NR	0
STATE OR LOCAL ASTM SUPPLEMENTAL								
AST		TP	NR	NR	NR	NR	NR	0
CLEANERS		0.250	0	0	NR	NR	NR	0
CA WDS		TP	NR	NR	NR	NR	NR	0
DEED		0.500	0	0	0	NR	NR	0
NFA		0.250	0	0	NR	NR	NR	0
WIP		0.250	0	0	NR	NR	NR	0
EMI		TP	NR	NR	NR	NR	NR	0
REF		0.250	0	0	NR	NR	NR	0
SCH		0.250	0	0	NR	NR	NR	0
NFE		0.250	0	0	NR	NR	NR	0
SLIC		0.500	0	0	3	NR	NR	3
HAZNET		TP	NR	NR	NR	NR	NR	0
Contra Costa Co. Site List		0.250	0	6	NR	NR	NR	6
EDR PROPRIETARY HISTORICAL DATABASES								
Coal Gas		1.000	0	0	0	0	NR	0
BROWNFIELDS DATABASES								
US BROWNFIELDS		0.500	0	0	0	NR	NR	0
US INST CONTROL		0.500	0	0	0	NR	NR	0
VCP		0.500	0	0	0	NR	NR	0

NOTES:

AQUIFLOW - see EDR Physical Setting Source Addendum

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

Coal Gas Site Search: No site was found in a search of Real Property Scan's ENVIROHAZ database.

A1
SE
1/8-1/4
679 ft.

MELLO'S SHEET METAL
1241 MAIN ST
OAKLEY, CA 94561

UST **U003971242**
N/A

Site 1 of 2 in cluster A

Relative:
Higher

Actual:
24 ft.

State UST:

Facility ID:	770097
Total Tanks:	1
Region:	STATE
Local Agency:	7000

A2
SE
1/8-1/4
679 ft.

MELLO'S SHEET METAL
1241 MAIN ST
OAKLEY, CA

CONTRA COSTA CO. SITE LIST **S106175820**
N/A

Site 2 of 2 in cluster A

Relative:
Higher

Actual:
24 ft.

Contra Costa SL:

Facility ID:	770097
Region:	CONTRA COSTA
Facility Status:	ACTIVE
Inactive Date:	Not reported
Tier:	Not reported
Program Status:	
UST:	X
HWG:	Yes
HMMP:	Yes
AGT:	Not reported
ARP:	Not reported
Generator Fee Item:	Not reported

3
ESE
1/8-1/4
946 ft.

PALEX
1315 MAIN ST
OAKLEY, CA 94561

HAZNET
CONTRA COSTA CO. SITE LIST
CA WDS

S102261399
N/A

Relative:
Higher

Actual:
26 ft.

HAZNET:

Gepaid:	CAL000092163
TSD EPA ID:	CAD053044053
Gen County:	7
Tsd County:	1
Tons:	.2124
Waste Category:	Liquids with halogenated organic compounds > 1000 mg/l
Disposal Method:	Transfer Station
Contact:	BAY AREA PALLET CO
Telephone:	(510) 625-2020
Mailing Address:	1315 MAIN STREET OAKLEY, CA 94561
County	7

PALEX (Continued) **S102261399**

Gepaid: CAL000092163
TSD EPA ID: CAL000161743
Gen County: 7
Tsd County: Santa Clara
Tons: 0.2293
Waste Category: Aqueous solution with less than 10% total organic residues
Disposal Method: Transfer Station
Contact: BAY AREA PALLET CO
Telephone: (510) 625-2020
Mailing Address: 1315 MAIN STREET
OAKLEY, CA 94561
County 7

Gepaid: CAL000092163
TSD EPA ID: CAD980818645
Gen County: 7
Tsd County: Kern
Tons: 1.9599
Waste Category: Aqueous solution with less than 10% total organic residues
Disposal Method: Transfer Station
Contact: BAY AREA PALLET CO
Telephone: (510) 625-2020
Mailing Address: 1315 MAIN STREET
OAKLEY, CA 94561
County 7

Gepaid: CAL000092163
TSD EPA ID: CAL000051079
Gen County: 7
Tsd County: Sacramento
Tons: 1.4178
Waste Category: Unspecified oil-containing waste
Disposal Method: Transfer Station
Contact: BAY AREA PALLET CO
Telephone: (510) 625-2020
Mailing Address: 1315 MAIN STREET
OAKLEY, CA 94561
County 7

Gepaid: CAL000092163
TSD EPA ID: Not reported
Gen County: Contra Costa
Tsd County: Alameda
Tons: 0.62
Waste Category: Liquids with halogenated organic compounds > 1000 mg/l
Disposal Method: Transfer Station
Contact: VINCE SHELDON GENERAL MANAGER
Telephone: (925) 625-2020
Mailing Address: 1315 MAIN STREET
OAKLEY, CA 94561
County Not reported

Click this hyperlink while viewing on your computer to access
4 additional CA HAZNET record(s) in the EDR Site Report.

WDS:
Facility ID: 5S 07I013552
Facility Contact VINCE SHELDON
Facility Telephone (925) 625-2020
SIC Code: 2448
SIC Code 2: Not reported

PALEX (Continued) **S102261399**

Agency Name: BAY AREA PALLET CO
Agency Address: 1315 MAIN ST
OAKLEY 94561
Agency Contact: VINCE SHELDON
Agency Phone: (925) 625-2020
Design Flow: 0 Million Gal/Day
Baseline Flow: Not reported
Facility Type: Other - Does not fall into the category of Municipal/Domestic, Industrial, Agricultural or Solid Waste (Class I, II or III)
Facility Status: Active - Any facility with a continuous or seasonal discharge that is under Waste Discharge Requirements.
Agency Type: 7
Waste Type: Stormwater Runoff - Inert/Influent or Solid Wastes that do not contain soluble pollutants or organic wastes and have little adverse impact on water quality. Such wastes could cause turbidity and siltation. Uncontaminated soils, rubble and concrete are examples of this category.
Threat to Water: Not reported
Complexity: Category C - Facilities having no waste treatment systems, such as cooling water dischargers or thosewho must comply through best management practices, facilities with passive waste treatment and disposal systems, such as septic systems with subsurface disposal, or dischargers having waste storage systems with land disposal such as dairy waste ponds.
Reclamation: No reclamation requirements associated with this facility.
POTW: The facility is not a POTW.
NPDES Number: CAS000001 The 1st 2 characters designate the state. The remaining 7 are assigned by the Regional Board
Subregion: 0

Contra Costa SL:
Facility ID: 771316
Region: CONTRA COSTA
Facility Status: ACTIVE
Inactive Date: Not reported
Tier: Not reported
Program Status:
UST: Not reported
HWG: Yes
HMMP: Yes
AGT: Yes
ARP: Not reported
Generator Fee Item: Not reported

B4
WSW
1/8-1/4
1067 ft.

Relative:
Higher

Actual:
30 ft.

DRIFTWOOD MARINA
BRIDGEHEAD ROAD
ANTIOCH, CA 94509

HIST UST **U001596219**
N/A

Site 1 of 5 in cluster B

UST HIST:

Facility ID:	14099	Owner Name:	KEY LEASE CORP
Total Tanks:	0	Region:	STATE
Owner Address:	617 VETERANS BLVD. SUITE 105 REDWOOD CITY, CA 94063		
Tank Used for:	PRODUCT		
Tank Num:	1	Container Num:	1
Tank Capacity:	00006000	Year Installed:	Not reported
Type of Fuel:	UNLEADED	Tank Construction:	Not Reported
Leak Detection:	None		
Contact Name:	TROY ANDREWS, HARBOR MASTER	Telephone:	(415) 757-9449
Facility Type:	Gas Station	Other Type:	BOAT MARINA

DRIFTWOOD MARINA (Continued) **U001596219**

Facility ID:	14099	Owner Name:	KEY LEASE CORP
Total Tanks:	0	Region:	STATE
Owner Address:	617 VETERANS BLVD. SUITE 105 REDWOOD CITY, CA 94063		
Tank Used for:	Not Reported		
Tank Num:	2	Container Num:	2
Tank Capacity:	00006000	Year Installed:	Not reported
Type of Fuel:	Not reported	Tank Construction:	Not Reported
Leak Detection:	None		
Contact Name:	TROY ANDREWS, HARBOR MASTER	Telephone:	(415) 757-9449
Facility Type:	Gas Station	Other Type:	BOAT MARINA

Facility ID:	14099	Owner Name:	KEY LEASE CORP
Total Tanks:	0	Region:	STATE
Owner Address:	617 VETERANS BLVD. SUITE 105 REDWOOD CITY, CA 94063		
Tank Used for:	Not Reported		
Tank Num:	3	Container Num:	3
Tank Capacity:	00001000	Year Installed:	Not reported
Type of Fuel:	Not reported	Tank Construction:	Not Reported
Leak Detection:	None		
Contact Name:	TROY ANDREWS, HARBOR MASTER	Telephone:	(415) 757-9449
Facility Type:	Gas Station	Other Type:	BOAT MARINA

B5
WSW
1/8-1/4
1071 ft.

Relative:
Higher

Actual:
30 ft.

ANTIOCH SHELL
5545 BRIDGEHEAD RD
ANTIOCH, CA 94509

UST **U003784319**
N/A

Site 2 of 5 in cluster B

State UST:

Facility ID:	770161
Total Tanks:	1
Region:	STATE
Local Agency:	7000

B6
WSW
1/8-1/4
1071 ft.

Relative:
Higher

Actual:
30 ft.

SHELL
5545 BRIDGEHEAD RD
ANTIOCH, CA 94509

HAZNET **S105126746**
SWEEPS UST **N/A**

Site 3 of 5 in cluster B

HAZNET:

Gepaid:	CAL000162473
TSD EPA ID:	CAD009466392
Gen County:	7
Tsd County:	7
Tons:	.0000
Waste Category:	Empty containers less than 30 gallons
Disposal Method:	Recycler
Contact:	EQUILON ENTERPRISES LLC
Telephone:	(713) 241-2258
Mailing Address:	PO BOX 2099 HOUSTON, TX 77252 - 2099
County	7

SWEEPS:

Status :	A

SHELL (Continued) **S105126746**

Comp Number : 70161
Number : 1
Board Of Equalization : 44-000074
Ref Date : 11-30-93
Act Date : 04-16-94
Created Date : 07-22-88
Tank Status : A
Owner Tank Id : 0258-07-SRU-1
Swrcb Tank Id : 07-000-070161-000001
Actv Date : 11-30-93
Capacity : 12000
Tank Use : M.V. FUEL
Stg : P
Content : REG UNLEADED
Number Of Tanks : 4

Status : A
Comp Number : 70161
Number : 1
Board Of Equalization : 44-000074
Ref Date : 11-30-93
Act Date : 04-16-94
Created Date : 07-22-88
Tank Status : A
Owner Tank Id : 0258-07-RU-1
Swrcb Tank Id : 07-000-070161-000002
Actv Date : 11-30-93
Capacity : 12000
Tank Use : M.V. FUEL
Stg : P
Content : REG UNLEADED
Number Of Tanks : Not reported

Status : A
Comp Number : 70161
Number : 1
Board Of Equalization : 44-000074
Ref Date : 11-30-93
Act Date : 04-16-94
Created Date : 07-22-88
Tank Status : A
Owner Tank Id : 0258-07-DSL-1
Swrcb Tank Id : 07-000-070161-000003
Actv Date : 11-30-93
Capacity : 12000
Tank Use : M.V. FUEL
Stg : P
Content : DIESEL
Number Of Tanks : Not reported

Status : A
Comp Number : 70161
Number : 1
Board Of Equalization : 44-000074
Ref Date : 11-30-93
Act Date : 04-16-94
Created Date : 07-22-88

SHELL (Continued) **S105126746**

Tank Status : A
Owner Tank Id : 0258-07-SU-1
Swrcb Tank Id : 07-000-070161-000004
Actv Date : 11-30-93
Capacity : 12000
Tank Use : M.V. FUEL
Stg : P
Content : PRM UNLEADED
Number Of Tanks : Not reported

B7
WSW
1/8-1/4
1075 ft.

Relative:
Higher

Actual:
30 ft.

ARCO PRODUCTS #6301
5540 BRIDGEHEAD RD
OAKLEY, CA 94561

UST **U003938199**
N/A

Site 4 of 5 in cluster B

State UST:
Facility ID: 752684
Total Tanks: 1
Region: STATE
Local Agency: 7000

B8
WSW
1/8-1/4
1075 ft.

Relative:
Higher

Actual:
30 ft.

BRIDGEHEAD INC
5540 BRIDGEHEAD RD
OAKLEY, CA 94561

HAZNET **S101294138**
LUST **N/A**
CHMIRS
Cortese
CONTRA COSTA CO. SITE LIST

Site 5 of 5 in cluster B

State LUST:
Cross Street: HWY 4
Qty Leaked: Not reported
Case Number 070070
Reg Board: 5S
Chemical: Gasoline
Lead Agency: Regional Board
Local Agency : 07000
Case Type: Drinking Water Aquifer affected
Status: Case Closed
Review Date: 1993-03-23 00:00:00 Confirm Leak: 1993-03-23 00:00:00
Workplan: 1997-10-14 00:00:00 Prelim Assess: 1997-10-14 00:00:00
Pollution Char: Not reported Remed Plan: Not reported
Remed Action: Not reported
Monitoring: Not reported
Close Date: 2003-06-20 00:00:00
Release Date: 1993-04-09 00:00:00
Cleanup Fund Id : Not reported
Discover Date : 1993-03-23 00:00:00
Enforcement Dt : 2000-11-08 00:00:00
Enf Type: CLOS
Enter Date : 1993-05-14 00:00:00
Funding: Responsible Party
Staff Initials: Not reported
How Discovered: Tank Closure
How Stopped: Not reported
Interim : Not reported
Leak Cause: UNK
Leak Source: UNK
MTBE Date : 1999-06-21 00:00:00

BRIDGEHEAD INC (Continued) **S101294138**

Max MTBE GW : 43.00 Parts per Billion
MTBE Tested: MTBE Detected. Site tested for MTBE & MTBE detected
Priority: High priority
Local Case # : Not reported
Beneficial: Not reported
Staff : PMV
GW Qualifier : =
Max MTBE Soil : Not reported
Soil Qualifier : Not reported
Hydr Basin #: SAN JOAQUIN VALLEY (
Operator : Not reported
Oversight Prgm: LUST
Review Date : 2001-04-03 00:00:00
Stop Date : Not reported
Work Suspended :No
Responsible PartyBRIDGEHEAD INC
RP Address: 2743 G ST, ANTIOCH, CA 94509
Global Id: T0601300789
Org Name: Not reported
Contact Person: Not reported
MTBE Conc: 6
Mtbe Fuel: 1
Water System Name: Not reported
Well Name: Not reported
Distance To Lust: 0
Waste Discharge Global ID: Not reported
Waste Disch Assigned Name: Not reported
Summary : 2 EA 8000 GAL GAS, 1 EA 8000 GAL DIESEL, & 1 EA 300 GAL WASTE OIL TANKS WERE PULLED IN MAR'93. SITE OVEREXCAVATED UNTIL MAJOR HC'S WERE ND. 2 EA MW'S INSTALLED IN OCT'94. 4 MW'S INSTALLED NOV'97.

LUST Region 5:
Substance: GASOLINE
Case Type: Drinking Water Aquifer affected
Program: LUST
Staff Initials: PMV Case Number: 070070
Status: Case Closed
MTBE Code: 2
Lead Agency: Regional

HAZNET:
Gepaid: CAL000244446
TSD EPA ID: Not reported
Gen County: Contra Costa
Tsd County: Los Angeles
Tons: 1.03
Waste Category: Aqueous solution with less than 10% total organic residues
Disposal Method: Recycler
Contact: CARLOS RODRIGUEZ
Telephone: (714) 670-5402
Mailing Address: PO BOX 6038
ARTESIA, CA 90702 - 6038
County Not reported

CORTESE:
Region: CORTESE
Fac Address 2: 5540 BRIDGEHEAD RD

CHMIRS:

BRIDGEHEAD INC (Continued) **S101294138**

OES Control Number:	01-5832
Chemical Name:	Gasoline;;;
Extent of Release:	Not reported
Property Use:	Not reported
Incident Date:	Not reported
Date Completed:	Not reported
Time Completed :	Not reported
Agency Id Number :	Not reported
Agency Incident Number :	Not reported
OES Incident Number :	01-5832
Time Notified :	Not reported
Surrounding Area :	Not reported
Estimated Temperature :	Not reported
Property Management :	Not reported
More Than Two Substances Involved? :	Not reported
Special Studies 1 :	Not reported
Special Studies 2 :	Not reported
Special Studies 3 :	Not reported
Special Studies 4 :	Not reported
Special Studies 5 :	Not reported
Special Studies 6 :	Not reported
Responding Agency Personel # Of Injuries :	Not reported
Responding Agency Personel # Of Fatalities :	0
Resp Agncy Personel # Of Decontaminated :	Not reported
Others Number Of Decontaminated :	Not reported
Others Number Of Injuries :	Not reported
Others Number Of Fatalities :	Not reported
Vehicle Make/year :	Not reported
Vehicle License Number :	Not reported
Vehicle State :	Not reported
Vehicle Id Number :	Not reported
CA/DOT/PUC/ICC Number :	Not reported
Company Name :	Not reported
Reporting Officer Name/ID :	Not reported
Report Date :	Not reported
Comments :	Not reported
Facility Telephone Number :	Not reported
Waterway Involved :	No
Waterway :	Not reported
Spill Site :	Service Station
Cleanup By :	Fire Dept.
Containment :	Yes
What Happened :	Not reported
Type :	Not reported
Other :	Not reported
Chemical 1 :	Not Reported
Chemical 2 :	Not Reported
Chemical 3 :	Not Reported
Date/Time :	10/15/200109:26:52 AM
Evacuations :	0
True date :	12/31/03
Year :	2001
Agency :	Arco
BBLS :	0
Cups :	0
CUFT :	0
Gallons :	10

BRIDGEHEAD INC (Continued) **S101294138**

Grams :	0
Pounds :	0
Liters :	0
Ounces :	0
Pints :	0
Quarts :	0
Sheen :	0
Tons :	0
Unknown :	0.000000
Description :	A hose at service station came loose and spill gasoline.
Incident date :	10/13/200112:00:00 AM
Admin Agency :	Contra Costa County Health Services Dept.
OES date :	Not reported
OES time :	Not reported
Amount :	Not reported

Contra Costa SL:

Facility ID:	752684
Region:	CONTRA COSTA
Facility Status:	ACTIVE
Inactive Date:	Not reported
Tier:	Not reported
Program Status:	
UST:	X
HWG:	Yes
HMMP:	Yes
AGT:	Not reported
ARP:	Not reported
Generator Fee Item:	Not reported

C9
ESE
1/8-1/4
1154 ft.

Relative:
Higher

Actual:
27 ft.

DELTA SCRAP & SALVAGE
1371 MAIN ST
OAKLEY, CA 94561

CONTRA COSTA CO. SITE LIST **S103172297**
N/A

Site 1 of 2 in cluster C

Contra Costa SL:

Facility ID:	772395
Region:	CONTRA COSTA
Facility Status:	INACTIVE
Inactive Date:	2001-03-12 00:00:00
Tier:	Not reported
Program Status:	
UST:	Not reported
HWG:	Not reported
HMMP:	Not reported
AGT:	Not reported
ARP:	Not reported
Generator Fee Item:	Yes

C10 **GE SALES/DELTA SCRAP** **CONTRA COSTA CO. SITE LIST** **S105455310**
ESE **1371 MAIN ST** **N/A**
1/8-1/4 **OAKLEY, CA**
1154 ft.

Site 2 of 2 in cluster C

Relative:
Higher

Actual:
27 ft.

Contra Costa SL:
Facility ID: 772867
Region: CONTRA COSTA
Facility Status: ACTIVE
Inactive Date: Not reported
Tier: Not reported
Program Status:
UST: Not reported
HWG: Yes
HMMP: Yes
AGT: Not reported
ARP: Not reported
Generator Fee Item: Not reported

---

11 **G E SALES** **CONTRA COSTA CO. SITE LIST** **S104733021**
WNW **5801 BRIDGEHEAD RD** **N/A**
1/8-1/4 **OAKLEY, CA 94561**
1214 ft.

Relative:
Equal

Actual:
22 ft.

Contra Costa SL:
Facility ID: 772989
Region: CONTRA COSTA
Facility Status: INACTIVE
Inactive Date: 2001-04-17 00:00:00
Tier: Not reported
Program Status:
UST: Not reported
HWG: Not reported
HMMP: Not reported
AGT: Not reported
ARP: Not reported
Generator Fee Item: Not reported

---

12 **CHEVRON #9-3801** **LUST** **S102427224**
SW **5433 NEROLY RD** **Cortese** **N/A**
1/4-1/2 **ANTIOCH, CA 94509** **CONTRA COSTA CO. SITE LIST**
1547 ft.

Relative:
Higher

Actual:
32 ft.

State LUST:
Cross Street: Not reported
Qty Leaked: Not reported
Case Number 070047
Reg Board: 5S
Chemical: Gasoline
Lead Agency: Regional Board
Local Agency : 07000
Case Type: Drinking Water Aquifer affected
Status: Case Closed
Review Date: Not reported Confirm Leak: Not reported
Workplan: 1988-11-23 00:00:00 Prelim Assess: 1988-11-23 00:00:00
Pollution Char: Not reported Remed Plan: Not reported
Remed Action: Not reported
Monitoring: Not reported
Close Date: 2002-05-29 00:00:00

CHEVRON #9-3801 (Continued) **S102427224**

Release Date: 1988-11-23 00:00:00
Cleanup Fund Id : Not reported
Discover Date : Not reported
Enforcement Dt : 2001-05-15 00:00:00
Enf Type: None Taken
Enter Date : 1990-01-22 00:00:00
Funding: Not reported
Staff Initials: BRU
How Discovered: Not reported
How Stopped: Not reported
Interim : Not reported
Leak Cause: Not reported
Leak Source: Not reported
MTBE Date : 2000-06-03 00:00:00
Max MTBE GW : 4.20 Parts per Billion
MTBE Tested: MTBE Detected. Site tested for MTBE & MTBE detected
Priority: Medium priority
Local Case # : Not reported
Beneficial: Not reported
Staff : PMV
GW Qualifier : =
Max MTBE Soil : Not reported
Soil Qualifier : Not reported
Hydr Basin #: SAN JOAQUIN VALLEY (
Operator : Not reported
Oversight Prgm: LUST
Review Date : 2000-12-18 00:00:00
Stop Date : Not reported
Work Suspended :No
Responsible PartyCHEVRON
RP Address: 2410 CAMINO RAMON, SAN RAMON, CA 94583
Global Id: T0601300773
Org Name: Not reported
Contact Person: Not reported
MTBE Conc: 4
Mtbe Fuel: 1
Water System Name: Not reported
Well Name: Not reported
Distance To Lust: 0
Waste Discharge Global ID: Not reported
Waste Disch Assigned Name: Not reported
Summary : Not reported

LUST Region 5:
Substance: GASOLINE
Case Type: Drinking Water Aquifer affected
Program: LUST
Staff Initials: PMV Case Number: 070047
Status: Case Closed
MTBE Code: 0
Lead Agency: Regional

CORTESE:
Region: CORTESE
Fac Address 2: 5433 NEROLY RD

Contra Costa SL:
Facility ID: 707694
Region: CONTRA COSTA

CHEVRON #9-3801 (Continued) **S102427224**

Facility Status: INACTIVE
Inactive Date: 2000-08-23 00:00:00
Tier: Not reported
Program Status:
  UST: Not reported
  HWG: Not reported
  HMMP: Not reported
  AGT: Not reported
  ARP: Not reported
Generator Fee Item: Not reported

D13
NNW
1/4-1/2
2386 ft.

Relative:
Lower

Actual:
21 ft.

DU PONT ANTIOCH WORKS
6000 BRIDGEHEAD RD
ANTIOCH, CA 94509

LUST **S101580703**
Cortese **N/A**
CA FID UST
SWEEPS UST

Site 1 of 5 in cluster D

State LUST:
Cross Street: WILBUR
Qty Leaked: 1
Case Number 070004
Reg Board: 5S
Chemical: Unleaded Gasoline
Lead Agency: Regional Board
Local Agency : 07000
Case Type: Drinking Water Aquifer affected
Status: Remedial action (cleanup) Underway
Review Date: Not reported Confirm Leak: Not reported
Workplan: Not reported Prelim Assess: Not reported
Pollution Char: Not reported Remed Plan: Not reported
Remed Action: 2001-05-01 00:00:00
Monitoring: Not reported
Close Date: 2000-04-28 00:00:00
Release Date: 1986-08-21 00:00:00
Cleanup Fund Id : Not reported
Discover Date : 1986-08-03 00:00:00
Enforcement Dt : 1965-01-01 00:00:00
Enf Type: Cleanup and Abatement Orders
Enter Date : 1986-12-31 00:00:00
Funding: Not reported
Staff Initials: BRU
How Discovered: Tank Closure
How Stopped: Not reported
Interim : Not reported
Leak Cause: Spill
Leak Source: Other Source
MTBE Date : Not reported
Max MTBE GW : Not reported
MTBE Tested: Site NOT Tested for MTBE.Includes Unknown and Not Analyzed.
Priority: High priority
Local Case # : Not reported
Beneficial: Not reported
Staff : DLL
GW Qualifier : Not reported
Max MTBE Soil : Not reported
Soil Qualifier : Not reported
Hydr Basin #: SAN JOAQUIN VALLEY (
Operator : Not reported
Oversight Prgm: LUFT

DU PONT ANTIOCH WORKS (Continued) **S101580703**

Review Date : 2000-04-28 00:00:00
Stop Date : 1986-08-04 00:00:00
Work Suspended :No
Responsible PartyE.I. DU PONT DE NEMOURS & CO.
RP Address: P.O. BOX 310, ANTIOCH, CA 94509
Global Id: T0601300745
Org Name: Not reported
Contact Person: Not reported
MTBE Conc: 0
Mtbe Fuel: 1
Water System Name: Not reported
Well Name: Not reported
Distance To Lust: 0
Waste Discharge Global ID: Not reported
Waste Disch Assigned Name: Not reported
Summary : Not reported

LUST Region 5:
Substance: UNLEAD GASOLINE
Case Type: Drinking Water Aquifer affected
Program: LUFT
Staff Initials: DLL Case Number: 070004
Status: Remedial action (cleanup) Underway
MTBE Code: N/A
Lead Agency: Regional

CORTESE:
Region: CORTESE
Fac Address 2: 6000 BRIDGEHEAD RD

FID:
Facility ID: 07000002 Regulate ID: CAD009151
Reg By: Active Underground Storage Tank Location
Cortese Code: Not reported SIC Code: Not reported
Status: Active Facility Tel: (415) 757-1210
Mail To: Not reported
6000 BRIDGEHEAD RD
ANTIOCH, CA 94509
Contact: Not reported Contact Tel: Not reported
DUNs No: Not reported NPDES No: Not reported
Creation: 10/22/93 Modified: 00/00/00
EPA ID: Not reported
Comments: Not reported

SWEEPS:
Status : Not reported
Comp Number : 8471
Number : Not reported
Board Of Equalization : Not reported
Ref Date : Not reported
Act Date : Not reported
Created Date : Not reported
Tank Status : Not reported
Owner Tank Id : Not reported
Swrcb Tank Id : 07-000-008471-000002
Actv Date : Not reported
Capacity : 6988
Tank Use : CHEMICAL
Stg : PRODUCT

DU PONT ANTIOCH WORKS (Continued) **S101580703**

Content :	UNKNOWN
Number Of Tanks :	5
Status :	Not reported
Comp Number :	8471
Number :	Not reported
Board Of Equalization :	Not reported
Ref Date :	Not reported
Act Date :	Not reported
Created Date :	Not reported
Tank Status :	Not reported
Owner Tank Id :	Not reported
Swrcb Tank Id :	07-000-008471-000003
Actv Date :	Not reported
Capacity :	25000
Tank Use :	CHEMICAL
Stg :	PRODUCT
Content :	UNKNOWN
Number Of Tanks :	Not reported
Status :	Not reported
Comp Number :	8471
Number :	Not reported
Board Of Equalization :	Not reported
Ref Date :	Not reported
Act Date :	Not reported
Created Date :	Not reported
Tank Status :	Not reported
Owner Tank Id :	Not reported
Swrcb Tank Id :	07-000-008471-000004
Actv Date :	Not reported
Capacity :	1000
Tank Use :	M.V. FUEL
Stg :	PRODUCT
Content :	DIESEL
Number Of Tanks :	Not reported
Status :	Not reported
Comp Number :	8471
Number :	Not reported
Board Of Equalization :	Not reported
Ref Date :	Not reported
Act Date :	Not reported
Created Date :	Not reported
Tank Status :	Not reported
Owner Tank Id :	Not reported
Swrcb Tank Id :	07-000-008471-000005
Actv Date :	Not reported
Capacity :	515
Tank Use :	M.V. FUEL
Stg :	PRODUCT
Content :	REG UNLEADED
Number Of Tanks :	Not reported
Status :	Not reported
Comp Number :	8471
Number :	Not reported

DU PONT ANTIOCH WORKS (Continued) **S101580703**

Board Of Equalization : Not reported
Ref Date : Not reported
Act Date : Not reported
Created Date : Not reported
Tank Status : Not reported
Owner Tank Id : Not reported
Swrcb Tank Id : 07-000-008471-000006
Actv Date : Not reported
Capacity : 5000
Tank Use : M.V. FUEL
Stg : PRODUCT
Content : REG UNLEADED
Number Of Tanks : Not reported

D14 **DUPONT CHEMICAL CO., ANTIOCH WORKS (E.I. DUPONT)** **SLIC** **S106717942**
NNW **6000 BRIDGEHEAD ROAD** **N/A**
1/4-1/2 **OAKLEY, CA**
2386 ft.

Site 2 of 5 in cluster D

Relative:
Lower

Actual:
21 ft.

CA STATE SLIC :
Global Id : SL0601340233
Region : STATE
Assigned Name : SLICSITE
Lead Agency Contact : DEVRA LEWIS
Lead Agency : CENTRAL VALLEY RWQCB (REGION 5S)
Lead Agency Case Number : Not reported
Responsible Party : Not reported
Recent Dtw : Not reported
Facility Status : Remediation Plan
Substance Released : SUB004, SUB005, SUB015, SUB030, SUB031

D15 **E. I. DUPONT DE NEMOURS & CO** **FINDS** **1000111309**
NNW **6000 BRIDGEHEAD RD** **RCRA-LQG** **CAD009151671**
1/4-1/2 **ANTIOCH, CA 94509** **RCRA-TSDF** [illegible]
2386 ft. **CORRACTS**
CERC-NFRAP
HIST UST

Site 3 of 5 in cluster D

Relative:
Lower

Actual:
21 ft.

CERCLIS-NFRAP Classification Data:
Federal Facility: Not a Federal Facility
Non NPL Code: NFRAP
NPL Status: Not on the NPL

CERCLIS-NFRAP Assessment History:

Assessment:	DISCOVERY	Completed:	11/01/1979
Assessment:	PRELIMINARY ASSESSMENT	Completed:	03/01/1985
Assessment:	SITE INSPECTION	Completed:	03/01/1985
Assessment:	PRELIMINARY ASSESSMENT	Completed:	11/23/1988
Assessment:	PRELIMINARY ASSESSMENT	Completed:	09/13/1990
Assessment:	ARCHIVE SITE	Completed:	09/13/1990

CERCLIS-NFRAP Alias Name(s):
DUPONT ANTIOCH WORKS

CORRACTS Data:

EPA Id: CAD009151671
Region: 9
Area Name: ENTIRE FACILITY
Actual Date: 01/01/1983

E. I. DUPONT DE NEMOURS & CO (Continued) **1000111309**

Corrective Action: CA100 - RFI Imposition
2002 NAICS Title: Inorganic Dye and Pigment Manufacturing
Inorganic Dye and Pigment Manufacturing
Inorganic Dye and Pigment Manufacturing
Inorganic Dye and Pigment Manufacturing

EPA Id: CAD009151671
Region: 9
Area Name: ENTIRE FACILITY
Actual Date: 01/10/2001
Corrective Action: CA725YE - Current Human Exposures Under Control, Yes, Current Human Exposures Under Control has been verified
2002 NAICS Title: Inorganic Dye and Pigment Manufacturing
Inorganic Dye and Pigment Manufacturing
Inorganic Dye and Pigment Manufacturing
Inorganic Dye and Pigment Manufacturing

EPA Id: CAD009151671
Region: 9
Area Name: ENTIRE FACILITY
Actual Date: 01/01/1995
Corrective Action: CA725YE - Current Human Exposures Under Control, Yes, Current Human Exposures Under Control has been verified
2002 NAICS Title: Inorganic Dye and Pigment Manufacturing
Inorganic Dye and Pigment Manufacturing
Inorganic Dye and Pigment Manufacturing
Inorganic Dye and Pigment Manufacturing

EPA Id: CAD009151671
Region: 9
Area Name: ENTIRE FACILITY
Actual Date: 01/10/2001
Corrective Action: CA750NO - Migration of Contaminated Groundwater under Control, Unacceptable migration of contaminated groundwater is observed or expected
2002 NAICS Title: Inorganic Dye and Pigment Manufacturing
Inorganic Dye and Pigment Manufacturing
Inorganic Dye and Pigment Manufacturing
Inorganic Dye and Pigment Manufacturing

EPA Id: CAD009151671
Region: 9
Area Name: ENTIRE FACILITY
Actual Date: 10/08/1997
Corrective Action: CA750NO - Migration of Contaminated Groundwater under Control, Unacceptable migration of contaminated groundwater is observed or expected
2002 NAICS Title: Inorganic Dye and Pigment Manufacturing
Inorganic Dye and Pigment Manufacturing
Inorganic Dye and Pigment Manufacturing
Inorganic Dye and Pigment Manufacturing

Click this hyperlink while viewing on your computer to access
13 additional CORRACTS record(s) in the EDR Site Report.

E. I. DUPONT DE NEMOURS & CO (Continued) **1000111309**

RCRAInfo Corrective Action Summary:

Event: RFI Workplan Approved
Event Date: 07/26/2004

Event: RFI Workplan Approved
Event Date: 07/09/2004

Event: Current Human Exposures under Control, Yes, Current Human Exposures Under Control has been verified. Based on a review of information contained in the EI determination, current human exposures are expected to be under control at the facility under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.
Event Date: 01/10/2001

Event: Igration of Contaminated Groundwater under Control, Unacceptable migration of contaminated groundwater is observed or expected.
Event Date: 01/10/2001

Event: Stabilization Measures Evaluation,This facility is amenable to stabilization activity based on the status of corrective action work at the facility, technical factors, the degree of risk, timing considerations and administrative considerations.
Event Date: 10/08/1997

Event: Igration of Contaminated Groundwater under Control, Unacceptable migration of contaminated groundwater is observed or expected.
Event Date: 10/08/1997

Event: Stabilization Measures Evaluation,This facility is not amenable to stabilization activity at the present time for reasons other than 1) it appears to be technically infeasible or inappropriate (NF) or 2) there is a lack of technical information (IN). Reasons for this conclusion may be the status of closure at the facility, the degree of risk, timing considerations, the status of corrective action work at the facility, or other administrative considerations.
Event Date: 02/10/1995

Event: Current Human Exposures under Control, Yes, Current Human Exposures Under Control has been verified. Based on a review of information contained in the EI determination, current human exposures are expected to be under control at the facility under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.
Event Date: 01/01/1995

Event: Igration of Contaminated Groundwater under Control, Yes, Migration of Contaminated Groundwater Under Control has been verified. Based on a review of information contained in the EI determination, it has been determined that migration of contaminated groundwater is under control at the facility. Specifically, this determination indicates that the migration of contaminated groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the existing area of contaminated groundwater. This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.
Event Date: 01/01/1995

E. I. DUPONT DE NEMOURS & CO (Continued) **1000111309**

Event:	Stabilization Measures Implemented, Groundwater extraction and treatment (e.g., to achieve groundwater containment, to achieve MCL).
Event Date:	06/30/1994
Event:	CA Prioritization, Facility or area was assigned a high corrective action priority.
Event Date:	11/23/1988
Event:	Stabilization Construction Completed
Event Date:	09/25/1985
Event:	Stabilization Measures Implemented, Primary measure is source removal and/or treatment (e.g., soil or waste excavation, in-situ soil treatment, off-site treatment).
Event Date:	01/28/1985
Event:	RFI Approved
Event Date:	02/20/1984
Event:	RFI Workplan Approved
Event Date:	01/10/1983
Event:	RFI Imposition
Event Date:	01/01/1983

RCRAInfo:

Owner:	E I DU PONT DE NEMOURS & CO INC (302) 774-3788
EPA ID:	CAD009151671
Contact:	Not reported
Classification:	Large Quantity Generator, TSDF
TSDF Activities:	Not reported
Violation Status:	Violations exist

Regulation Violated:	262.30-34.C
Area of Violation:	GENERATOR-ALL REQUIREMENTS (OVERSIGHT)
Date Violation Determined:	05/14/1996
Actual Date Achieved Compliance:	05/14/1996
Enforcement Action:	WRITTEN INFORMAL
Enforcement Action Date:	05/14/1996
Penalty Type:	Not reported
Regulation Violated:	262.50-60
Area of Violation:	GENERATOR-ALL REQUIREMENTS (OVERSIGHT)
Date Violation Determined:	05/14/1996
Actual Date Achieved Compliance:	05/14/1996
Enforcement Action:	WRITTEN INFORMAL
Enforcement Action Date:	05/14/1996
Penalty Type:	Not reported
Regulation Violated:	264.190-201.J
Area of Violation:	TSD-OTHER REQUIREMENTS (OVERSIGHT)
Date Violation Determined:	05/14/1996
Actual Date Achieved Compliance:	06/14/1996
Enforcement Action:	WRITTEN INFORMAL
Enforcement Action Date:	05/14/1996
Penalty Type:	Not reported
Regulation Violated:	270

E. I. DUPONT DE NEMOURS & CO (Continued) **1000111309**

Area of Violation:	TSD-OTHER REQUIREMENTS (OVERSIGHT)
Date Violation Determined:	09/28/1994
Actual Date Achieved Compliance:	09/28/1994
Enforcement Action:	WRITTEN INFORMAL
Enforcement Action Date:	10/04/1994
Penalty Type:	Not reported
Regulation Violated:	264.10-18.B
Area of Violation:	TSD-OTHER REQUIREMENTS (OVERSIGHT)
Date Violation Determined:	09/28/1994
Actual Date Achieved Compliance:	09/28/1994
Enforcement Action:	WRITTEN INFORMAL
Enforcement Action Date:	10/04/1994
Penalty Type:	Not reported
Regulation Violated:	262.50-60
Area of Violation:	GENERATOR-ALL REQUIREMENTS (OVERSIGHT)
Date Violation Determined:	09/28/1994
Actual Date Achieved Compliance:	11/03/1994
Enforcement Action:	WRITTEN INFORMAL
Enforcement Action Date:	10/04/1994
Penalty Type:	Not reported
Regulation Violated:	264.190-201.J
Area of Violation:	TSD-OTHER REQUIREMENTS (OVERSIGHT)
Date Violation Determined:	09/28/1994
Actual Date Achieved Compliance:	11/03/1994
Enforcement Action:	WRITTEN INFORMAL
Enforcement Action Date:	10/04/1994
Penalty Type:	Not reported
Regulation Violated:	262.50-60
Area of Violation:	GENERATOR-ALL REQUIREMENTS (OVERSIGHT)
Date Violation Determined:	02/03/1994
Actual Date Achieved Compliance:	11/03/1994
Enforcement Action:	WRITTEN INFORMAL
Enforcement Action Date:	02/07/1994
Penalty Type:	Proposed Monetary Penalty
Enforcement Action:	INITIAL 3008(A) COMPLIANCE ORDER
Enforcement Action Date:	06/30/1994
Penalty Type:	Proposed Monetary Penalty
Regulation Violated:	264.190-201.J
Area of Violation:	TSD-OTHER REQUIREMENTS (OVERSIGHT)
Date Violation Determined:	02/03/1994
Actual Date Achieved Compliance:	11/03/1994
Enforcement Action:	WRITTEN INFORMAL
Enforcement Action Date:	02/07/1994
Penalty Type:	Proposed Monetary Penalty
Enforcement Action:	INITIAL 3008(A) COMPLIANCE ORDER
Enforcement Action Date:	06/30/1994
Penalty Type:	Proposed Monetary Penalty
Regulation Violated:	264.10-18.B
Area of Violation:	TSD-OTHER REQUIREMENTS (OVERSIGHT)
Date Violation Determined:	02/03/1994

E. I. DUPONT DE NEMOURS & CO (Continued) **1000111309**

Actual Date Achieved Compliance:	09/28/1994
Enforcement Action:	WRITTEN INFORMAL
Enforcement Action Date:	02/07/1994
Penalty Type:	Proposed Monetary Penalty
Enforcement Action:	INITIAL 3008(A) COMPLIANCE ORDER
Enforcement Action Date:	06/30/1994
Penalty Type:	Proposed Monetary Penalty
Regulation Violated:	270
Area of Violation:	TSD-OTHER REQUIREMENTS (OVERSIGHT)
Date Violation Determined:	12/11/1990
Actual Date Achieved Compliance:	01/11/1991
Enforcement Action:	WRITTEN INFORMAL
Enforcement Action Date:	01/11/1991
Penalty Type:	Not reported
Regulation Violated:	270
Area of Violation:	TSD-OTHER REQUIREMENTS (OVERSIGHT)
Date Violation Determined:	11/27/1989
Actual Date Achieved Compliance:	12/11/1990
Enforcement Action:	WRITTEN INFORMAL
Enforcement Action Date:	01/25/1990
Penalty Type:	Not reported
Enforcement Action:	FINAL CONSENT DECREES
Enforcement Action Date:	09/11/1991
Penalty Type:	Not reported
Regulation Violated:	264.70-77.E
Area of Violation:	TSD-OTHER REQUIREMENTS (OVERSIGHT)
Date Violation Determined:	11/27/1989
Actual Date Achieved Compliance:	12/11/1990
Enforcement Action:	WRITTEN INFORMAL
Enforcement Action Date:	01/25/1990
Penalty Type:	Not reported
Enforcement Action:	FINAL CONSENT DECREES
Enforcement Action Date:	09/11/1991
Penalty Type:	Not reported
Regulation Violated:	264.110-120.G
Area of Violation:	TSD-CLOSURE/POST-CLOSURE REQUIREMENTS
Date Violation Determined:	11/27/1989
Actual Date Achieved Compliance:	12/11/1990
Enforcement Action:	WRITTEN INFORMAL
Enforcement Action Date:	01/25/1990
Penalty Type:	Not reported
Enforcement Action:	FINAL CONSENT DECREES
Enforcement Action Date:	09/11/1991
Penalty Type:	Not reported
Regulation Violated:	270
Area of Violation:	TSD-OTHER REQUIREMENTS (OVERSIGHT)
Date Violation Determined:	11/30/1988
Actual Date Achieved Compliance:	01/11/1991
Enforcement Action:	WRITTEN INFORMAL
Enforcement Action Date:	02/06/1989

E. I. DUPONT DE NEMOURS & CO (Continued) **1000111309**

Penalty Type: Not reported

Enforcement Action: FINAL CONSENT DECREES
Enforcement Action Date: 09/11/1991
Penalty Type: Not reported

Regulation Violated: 264.110-120.G
Area of Violation: TSD-CLOSURE/POST-CLOSURE REQUIREMENTS
Date Violation Determined: 11/30/1988
Actual Date Achieved Compliance: 12/11/1990

Enforcement Action: WRITTEN INFORMAL
Enforcement Action Date: 02/06/1989
Penalty Type: Not reported

Enforcement Action: FINAL CONSENT DECREES
Enforcement Action Date: 09/11/1991
Penalty Type: Not reported

Regulation Violated: 264.140-150.H
Area of Violation: TSD-FINANCIAL RESPONSIBILITY REQUIREMENTS
Date Violation Determined: 11/01/1988
Actual Date Achieved Compliance: 03/21/1989

Enforcement Action: WRITTEN INFORMAL
Enforcement Action Date: 11/28/1988
Penalty Type: Not reported

Regulation Violated: 268 ALL
Area of Violation: TSD-LAND BAN REQUIREMENTS
Date Violation Determined: 03/31/1988
Actual Date Achieved Compliance: 03/21/1989

Enforcement Action: WRITTEN INFORMAL
Enforcement Action Date: 06/03/1988
Penalty Type: Not reported

Enforcement Action: FINAL CONSENT DECREES
Enforcement Action Date: 09/11/1991
Penalty Type: Not reported

Regulation Violated: 268.7
Area of Violation: GENERATOR-LAND BAN REQUIREMENTS
Date Violation Determined: 03/31/1988
Actual Date Achieved Compliance: 03/21/1989

Enforcement Action: WRITTEN INFORMAL
Enforcement Action Date: 06/03/1988
Penalty Type: Not reported

Enforcement Action: FINAL CONSENT DECREES
Enforcement Action Date: 09/11/1991
Penalty Type: Not reported

Regulation Violated: 270
Area of Violation: TSD-OTHER REQUIREMENTS (OVERSIGHT)
Date Violation Determined: 03/29/1988
Actual Date Achieved Compliance: 03/21/1989

Enforcement Action: WRITTEN INFORMAL
Enforcement Action Date: 06/03/1988
Penalty Type: Not reported

Enforcement Action: FINAL CONSENT DECREES
Enforcement Action Date: 09/11/1991

E. I. DUPONT DE NEMOURS & CO (Continued) **1000111309**

Penalty Type: Not reported

Regulation Violated: 264.110-120.G
Area of Violation: TSD-CLOSURE/POST-CLOSURE REQUIREMENTS
Date Violation Determined: 03/29/1988
Actual Date Achieved Compliance: 03/21/1989

Enforcement Action: WRITTEN INFORMAL
Enforcement Action Date: 06/03/1988
Penalty Type: Not reported

Enforcement Action: FINAL CONSENT DECREES
Enforcement Action Date: 09/11/1991
Penalty Type: Not reported

Regulation Violated: 264.90-94.F
Area of Violation: TSD-GOUNDWATER MONITORING REQUIREMENTS
Date Violation Determined: 03/29/1988
Actual Date Achieved Compliance: 03/21/1989

Enforcement Action: WRITTEN INFORMAL
Enforcement Action Date: 06/03/1988
Penalty Type: Not reported

Enforcement Action: FINAL CONSENT DECREES
Enforcement Action Date: 09/11/1991
Penalty Type: Not reported

Penalty Summary:

Penalty Description	Penalty Date	Penalty Amount	Lead Agency
Proposed Monetary Penalty	6/30/1994	200000	STATE

There are 22 violation record(s) reported at this site:

Evaluation	Area of Violation	Date of Compliance
Compliance Evaluation Inspection	GENERATOR-ALL REQUIREMENTS (OVERSIGHT)	19960514
	GENERATOR-ALL REQUIREMENTS (OVERSIGHT)	19960514
	TSD-OTHER REQUIREMENTS (OVERSIGHT)	19960614
Compliance Evaluation Inspection	TSD-OTHER REQUIREMENTS (OVERSIGHT)	19940928
	TSD-OTHER REQUIREMENTS (OVERSIGHT)	19940928
	GENERATOR-ALL REQUIREMENTS (OVERSIGHT)	19941103
	TSD-OTHER REQUIREMENTS (OVERSIGHT)	19941103
Compliance Evaluation Inspection	GENERATOR-ALL REQUIREMENTS (OVERSIGHT)	19941103
	TSD-OTHER REQUIREMENTS (OVERSIGHT)	19941103
	TSD-OTHER REQUIREMENTS (OVERSIGHT)	19940928
Compliance Evaluation Inspection	TSD-OTHER REQUIREMENTS (OVERSIGHT)	19910111
Compliance Evaluation Inspection	TSD-OTHER REQUIREMENTS (OVERSIGHT)	19901211
	TSD-OTHER REQUIREMENTS (OVERSIGHT)	19901211
	TSD-CLOSURE/POST-CLOSURE REQUIREMENTS	19901211
Compliance Evaluation Inspection	TSD-OTHER REQUIREMENTS (OVERSIGHT)	19910111
	TSD-CLOSURE/POST-CLOSURE REQUIREMENTS	19901211
Financial Record Review	TSD-FINANCIAL RESPONSIBILITY REQUIREMENTS	19890321
Other Evaluation	TSD-LAND BAN REQUIREMENTS	19890321
	GENERATOR-LAND BAN REQUIREMENTS	19890321
Compliance Evaluation Inspection	TSD-OTHER REQUIREMENTS (OVERSIGHT)	19890321
	TSD-CLOSURE/POST-CLOSURE REQUIREMENTS	19890321
	TSD-GOUNDWATER MONITORING REQUIREMENTS	19890321

E. I. DUPONT DE NEMOURS & CO (Continued) **1000111309**

FINDS:
Other Pertinent Environmental Activity Identified at Site:
HAZARDOUS WASTE TRACKING SYSTEM-DATAMART
INTEGRATED COMPLIANCE INFORMATION SYSTEM
NATIONAL COMPLIANCE DATABASE SYSTEM
NATIONAL EMISSIONS INVENTORY
RESOURCE CONSERVATION AND RECOVERY ACT INFORMATION SYSTEM
TOXIC CHEMICAL RELEASE INVENTORY SYSTEM

UST HIST:

Facility ID:	8471	Owner Name:	E.I. DU PONT DE NEMOURS&CO.INC
Total Tanks:	28	Region:	STATE
Owner Address:	P.O. BOX 310 ANTIOCH, CA 94509		
Tank Used for:	WASTE		
Tank Num:	1	Container Num:	101
Tank Capacity:	00751000	Year Installed:	1969
Type of Fuel:	Not reported	Tank Construction:	4 inches
Leak Detection:	None		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Facility Type:	Other	Other Type:	CHEMICAL MFG.

Facility ID:	8471	Owner Name:	E.I. DU PONT DE NEMOURS&CO.INC
Total Tanks:	28	Region:	STATE
Owner Address:	P.O. BOX 310 ANTIOCH, CA 94509		
Tank Used for:	WASTE		
Tank Num:	2	Container Num:	102
Tank Capacity:	02478000	Year Installed:	1971
Type of Fuel:	Not reported	Tank Construction:	4 inches
Leak Detection:	None		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Facility Type:	Other	Other Type:	CHEMICAL MFG.

Facility ID:	8471	Owner Name:	E.I. DU PONT DE NEMOURS&CO.INC
Total Tanks:	28	Region:	STATE
Owner Address:	P.O. BOX 310 ANTIOCH, CA 94509		
Tank Used for:	WASTE		
Tank Num:	3	Container Num:	103
Tank Capacity:	02260000	Year Installed:	1972
Type of Fuel:	Not reported	Tank Construction:	4 inches
Leak Detection:	None		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Facility Type:	Other	Other Type:	CHEMICAL MFG.

Facility ID:	8471	Owner Name:	E.I. DU PONT DE NEMOURS&CO.INC
Total Tanks:	28	Region:	STATE
Owner Address:	P.O. BOX 310 ANTIOCH, CA 94509		
Tank Used for:	WASTE		
Tank Num:	4	Container Num:	104
Tank Capacity:	01870000	Year Installed:	1956
Type of Fuel:	Not reported	Tank Construction:	120 inches
Leak Detection:	None		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Facility Type:	Other	Other Type:	CHEMICAL MFG.

E. I. DUPONT DE NEMOURS & CO (Continued) **1000111309**

Facility ID: 8471
Owner Name: E.I. DU PONT DE NEMOURS&CO.INC
Total Tanks: 28
Region: STATE
Owner Address: P.O. BOX 310
ANTIOCH, CA 94509
Tank Used for: WASTE
Tank Num: 5
Container Num: 105
Tank Capacity: 01870000
Year Installed: 1956
Type of Fuel: Not reported
Tank Construction: 120 inches
Leak Detection: None
Contact Name: D.T. ARGYRIOU
Telephone: (415) 779-6371
Facility Type: Other
Other Type: CHEMICAL MFG.

Facility ID: 8471
Owner Name: E.I. DU PONT DE NEMOURS&CO.INC
Total Tanks: 28
Region: STATE
Owner Address: P.O. BOX 310
ANTIOCH, CA 94509
Tank Used for: WASTE
Tank Num: 6
Container Num: 106
Tank Capacity: 00001500
Year Installed: 1956
Type of Fuel: Not reported
Tank Construction: 6 inches
Leak Detection: None
Contact Name: D.T. ARGYRIOU
Telephone: (415) 779-6371
Facility Type: Other
Other Type: CHEMICAL MFG.

Facility ID: 8471
Owner Name: E.I. DU PONT DE NEMOURS&CO.INC
Total Tanks: 28
Region: STATE
Owner Address: P.O. BOX 310
ANTIOCH, CA 94509
Tank Used for: WASTE
Tank Num: 7
Container Num: 107
Tank Capacity: 00003800
Year Installed: 1972
Type of Fuel: Not reported
Tank Construction: 8 inches
Leak Detection: None
Contact Name: D.T. ARGYRIOU
Telephone: (415) 779-6371
Facility Type: Other
Other Type: CHEMICAL MFG.

Facility ID: 8471
Owner Name: E.I. DU PONT DE NEMOURS&CO.INC
Total Tanks: 28
Region: STATE
Owner Address: P.O. BOX 310
ANTIOCH, CA 94509
Tank Used for: WASTE
Tank Num: 8
Container Num: 111
Tank Capacity: 00001400
Year Installed: 1974
Type of Fuel: Not reported
Tank Construction: 6 inches
Leak Detection: None
Contact Name: D.T. ARGYRIOU
Telephone: (415) 779-6371
Facility Type: Other
Other Type: CHEMICAL MFG.

Facility ID: 8471
Owner Name: E.I. DU PONT DE NEMOURS&CO.INC
Total Tanks: 28
Region: STATE
Owner Address: P.O. BOX 310
ANTIOCH, CA 94509
Tank Used for: Not Reported
Tank Num: 9
Container Num: 112
Tank Capacity: 00006227
Year Installed: 1956
Type of Fuel: Not reported
Tank Construction: 10 inches

E. I. DUPONT DE NEMOURS & CO (Continued) **1000111309**

Leak Detection: None
Contact Name: D.T. ARGYRIOU Telephone: (415) 779-6371
Facility Type: Other Other Type: CHEMICAL MFG.

Facility ID: 8471 Owner Name: E.I. DU PONT DE NEMOURS&CO.INC
Total Tanks: 28 Region: STATE
Owner Address: P.O. BOX 310
ANTIOCH, CA 94509
Tank Used for: Not Reported
Tank Num: 10 Container Num: 113
Tank Capacity: 00019400 Year Installed: 1967
Type of Fuel: Not reported Tank Construction: 10 inches
Leak Detection: None
Contact Name: D.T. ARGYRIOU Telephone: (415) 779-6371
Facility Type: Other Other Type: CHEMICAL MFG.

Facility ID: 8471 Owner Name: E.I. DU PONT DE NEMOURS&CO.INC
Total Tanks: 28 Region: STATE
Owner Address: P.O. BOX 310
ANTIOCH, CA 94509
Tank Used for: Not Reported
Tank Num: 11 Container Num: 114
Tank Capacity: 00048800 Year Installed: 1965
Type of Fuel: Not reported Tank Construction: 12 inches
Leak Detection: None
Contact Name: D.T. ARGYRIOU Telephone: (415) 779-6371
Facility Type: Other Other Type: CHEMICAL MFG.

Facility ID: 8471 Owner Name: E.I. DU PONT DE NEMOURS&CO.INC
Total Tanks: 28 Region: STATE
Owner Address: P.O. BOX 310
ANTIOCH, CA 94509
Tank Used for: Not Reported
Tank Num: 12 Container Num: 115
Tank Capacity: 00004320 Year Installed: 1956
Type of Fuel: Not reported Tank Construction: 8 inches
Leak Detection: None
Contact Name: D.T. ARGYRIOU Telephone: (415) 779-6371
Facility Type: Other Other Type: CHEMICAL MFG.

Facility ID: 8471 Owner Name: E.I. DU PONT DE NEMOURS&CO.INC
Total Tanks: 28 Region: STATE
Owner Address: P.O. BOX 310
ANTIOCH, CA 94509
Tank Used for: WASTE
Tank Num: 13 Container Num: 201
Tank Capacity: 00002400 Year Installed: 1961
Type of Fuel: Not reported Tank Construction: 2 inches
Leak Detection: None
Contact Name: D.T. ARGYRIOU Telephone: (415) 779-6371
Facility Type: Other Other Type: CHEMICAL MFG.

Facility ID: 8471 Owner Name: E.I. DU PONT DE NEMOURS&CO.INC
Total Tanks: 28 Region: STATE
Owner Address: P.O. BOX 310
ANTIOCH, CA 94509
Tank Used for: WASTE

E. I. DUPONT DE NEMOURS & CO (Continued) **1000111309**

Tank Num: 14
Tank Capacity: 00000540
Type of Fuel: Not reported
Leak Detection: None
Contact Name: D.T. ARGYRIOU
Facility Type: Other
Container Num: 202
Year Installed: 1979
Tank Construction: 0.5 inches
Telephone: (415) 779-6371
Other Type: CHEMICAL MFG.

Facility ID: 8471
Total Tanks: 28
Owner Address: P.O. BOX 310
ANTIOCH, CA 94509
Tank Used for: WASTE
Tank Num: 15
Tank Capacity: 01000000
Type of Fuel: Not reported
Leak Detection: None
Contact Name: D.T. ARGYRIOU
Facility Type: Other
Owner Name: E.I. DU PONT DE NEMOURS&CO.INC
Region: STATE
Container Num: 301
Year Installed: 1962
Tank Construction: Not Reported
Telephone: (415) 779-6371
Other Type: CHEMICAL MFG.

Facility ID: 8471
Total Tanks: 28
Owner Address: P.O. BOX 310
ANTIOCH, CA 94509
Tank Used for: WASTE
Tank Num: 16
Tank Capacity: 01000000
Type of Fuel: Not reported
Leak Detection: None
Contact Name: D.T. ARGYRIOU
Facility Type: Other
Owner Name: E.I. DU PONT DE NEMOURS&CO.INC
Region: STATE
Container Num: 302
Year Installed: 1965
Tank Construction: Not Reported
Telephone: (415) 779-6371
Other Type: CHEMICAL MFG.

Facility ID: 8471
Total Tanks: 28
Owner Address: P.O. BOX 310
ANTIOCH, CA 94509
Tank Used for: WASTE
Tank Num: 17
Tank Capacity: 00042500
Type of Fuel: Not reported
Leak Detection: None
Contact Name: D.T. ARGYRIOU
Facility Type: Other
Owner Name: E.I. DU PONT DE NEMOURS&CO.INC
Region: STATE
Container Num: 303
Year Installed: 1982
Tank Construction: 8 inches
Telephone: (415) 779-6371
Other Type: CHEMICAL MFG.

Facility ID: 8471
Total Tanks: 28
Owner Address: P.O. BOX 310
ANTIOCH, CA 94509
Tank Used for: WASTE
Tank Num: 18
Tank Capacity: 00035400
Type of Fuel: Not reported
Leak Detection: None
Contact Name: D.T. ARGYRIOU
Facility Type: Other
Owner Name: E.I. DU PONT DE NEMOURS&CO.INC
Region: STATE
Container Num: 304
Year Installed: 1971
Tank Construction: 8 inches
Telephone: (415) 779-6371
Other Type: CHEMICAL MFG.

Facility ID: 8471
Total Tanks: 28
Owner Name: E.I. DU PONT DE NEMOURS&CO.INC
Region: STATE

E. I. DUPONT DE NEMOURS & CO (Continued) **1000111309**

Owner Address:	P.O. BOX 310 ANTIOCH, CA 94509		
Tank Used for:	WASTE		
Tank Num:	19	Container Num:	305
Tank Capacity:	00004300	Year Installed:	1962
Type of Fuel:	Not reported	Tank Construction:	10 inches
Leak Detection:	None		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Facility Type:	Other	Other Type:	CHEMICAL MFG.

Facility ID:	8471	Owner Name:	E.I. DU PONT DE NEMOURS&CO.INC
Total Tanks:	28	Region:	STATE
Owner Address:	P.O. BOX 310 ANTIOCH, CA 94509		
Tank Used for:	WASTE		
Tank Num:	20	Container Num:	306
Tank Capacity:	00001300	Year Installed:	1984
Type of Fuel:	Not reported	Tank Construction:	3/8 inches
Leak Detection:	None		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Facility Type:	Other	Other Type:	CHEMICAL MFG.

Facility ID:	8471	Owner Name:	E.I. DU PONT DE NEMOURS&CO.INC
Total Tanks:	28	Region:	STATE
Owner Address:	P.O. BOX 310 ANTIOCH, CA 94509		
Tank Used for:	WASTE		
Tank Num:	21	Container Num:	307
Tank Capacity:	00006000	Year Installed:	1962
Type of Fuel:	Not reported	Tank Construction:	10 inches
Leak Detection:	None		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Facility Type:	Other	Other Type:	CHEMICAL MFG.

Facility ID:	8471	Owner Name:	E.I. DU PONT DE NEMOURS&CO.INC
Total Tanks:	28	Region:	STATE
Owner Address:	P.O. BOX 310 ANTIOCH, CA 94509		
Tank Used for:	PRODUCT		
Tank Num:	22	Container Num:	308
Tank Capacity:	00006988	Year Installed:	1963
Type of Fuel:	Not reported	Tank Construction:	0.25 inches
Leak Detection:	Not reported		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Facility Type:	Other	Other Type:	CHEMICAL MFG.

Facility ID:	8471	Owner Name:	E.I. DU PONT DE NEMOURS&CO.INC
Total Tanks:	28	Region:	STATE
Owner Address:	P.O. BOX 310 ANTIOCH, CA 94509		
Tank Used for:	WASTE		
Tank Num:	23	Container Num:	401
Tank Capacity:	00000420	Year Installed:	1956
Type of Fuel:	Not reported	Tank Construction:	6 inches
Leak Detection:	None		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Facility Type:	Other	Other Type:	CHEMICAL MFG.

E. I. DUPONT DE NEMOURS & CO (Continued) **1000111309**

Facility ID:	8471	Owner Name:	E.I. DU PONT DE NEMOURS&CO.INC
Total Tanks:	28	Region:	STATE
Owner Address:	P.O. BOX 310 ANTIOCH, CA 94509		
Tank Used for:	PRODUCT		
Tank Num:	24	Container Num:	402
Tank Capacity:	00025000	Year Installed:	1956
Type of Fuel:	Not reported	Tank Construction:	5/16 inches
Leak Detection:	None		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Facility Type:	Other	Other Type:	CHEMICAL MFG.

Facility ID:	8471	Owner Name:	E.I. DU PONT DE NEMOURS&CO.INC
Total Tanks:	28	Region:	STATE
Owner Address:	P.O. BOX 310 ANTIOCH, CA 94509		
Tank Used for:	PRODUCT		
Tank Num:	25	Container Num:	403
Tank Capacity:	00001000	Year Installed:	1962
Type of Fuel:	DIESEL	Tank Construction:	0.25 inches
Leak Detection:	Stock Inventor		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Facility Type:	Other	Other Type:	CHEMICAL MFG.

Facility ID:	8471	Owner Name:	E.I. DU PONT DE NEMOURS&CO.INC
Total Tanks:	28	Region:	STATE
Owner Address:	P.O. BOX 310 ANTIOCH, CA 94509		
Tank Used for:	PRODUCT		
Tank Num:	26	Container Num:	404
Tank Capacity:	00000515	Year Installed:	1979
Type of Fuel:	UNLEADED	Tank Construction:	12 gauge
Leak Detection:	Stock Inventor		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Facility Type:	Other	Other Type:	CHEMICAL MFG.

Facility ID:	8471	Owner Name:	E.I. DU PONT DE NEMOURS&CO.INC
Total Tanks:	28	Region:	STATE
Owner Address:	P.O. BOX 310 ANTIOCH, CA 94509		
Tank Used for:	PRODUCT		
Tank Num:	27	Container Num:	405
Tank Capacity:	00005000	Year Installed:	1975
Type of Fuel:	REGULAR	Tank Construction:	0.25 inches
Leak Detection:	Stock Inventor		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Facility Type:	Other	Other Type:	CHEMICAL MFG.

Facility ID:	8471	Owner Name:	E.I. DU PONT DE NEMOURS&CO.INC
Total Tanks:	28	Region:	STATE
Owner Address:	P.O. BOX 310 ANTIOCH, CA 94509		
Tank Used for:	WASTE		
Tank Num:	28	Container Num:	406
Tank Capacity:	00001001	Year Installed:	1962
Type of Fuel:	Not reported	Tank Construction:	6 inches

E. I. DUPONT DE NEMOURS & CO (Continued) **1000111309**

Leak Detection:	None		
Contact Name:	D.T. ARGYRIOU	Telephone:	(415) 779-6371
Facility Type:	Other	Other Type:	CHEMICAL MFG.

D16
NNW
1/4-1/2
2386 ft.

Relative:
Lower

Actual:
21 ft.

E I DUPONT DE NEMOURS & COMPANY INC
6000 BRIDGEHEAD RD
OAKLEY, CA 94561

Site 4 of 5 in cluster D

HAZNET
SLIC
CONTRA COSTA CO. SITE LIST
EMI
CA WDS

S104573837
N/A

HAZNET:

Gepaid: CAD009151671
TSD EPA ID: CAD009452657
Gen County: 7
Tsd County: San Mateo
Tons: .4250
Waste Category: Other organic solids
Disposal Method: Disposal, Land Fill
Contact: E I DUPONT DE NEMOURS & CO INC
Telephone: (302) 774-1000
Mailing Address: 6000 BRIDGEHEAD RD
OAKLEY, CA 94561 - 2940
County 7

Gepaid: CAD009151671
TSD EPA ID: CAD009452657
Gen County: 7
Tsd County: San Mateo
Tons: 8.3058
Waste Category: Liquids with halogenated organic compounds > 1000 mg/l
Disposal Method: Recycler
Contact: E I DUPONT DE NEMOURS & CO INC
Telephone: (302) 774-1000
Mailing Address: 6000 BRIDGEHEAD RD
OAKLEY, CA 94561 - 2940
County 7

Gepaid: CAD009151671
TSD EPA ID: CAD009452657
Gen County: 7
Tsd County: San Mateo
Tons: .1500
Waste Category: Laboratory waste chemicals
Disposal Method: Treatment, Incineration
Contact: E I DUPONT DE NEMOURS & CO INC
Telephone: (302) 774-1000
Mailing Address: 6000 BRIDGEHEAD RD
OAKLEY, CA 94561 - 2940
County 7

Gepaid: CAD009151671
TSD EPA ID: CAT000646117
Gen County: 7
Tsd County: Kings
Tons: .9000
Waste Category: Other organic solids
Disposal Method: Disposal, Other
Contact: E I DUPONT DE NEMOURS & CO INC
Telephone: (302) 774-1000
Mailing Address: 6000 BRIDGEHEAD RD

E I DUPONT DE NEMOURS & COMPANY INC (Continued) **S104573837**

OAKLEY, CA 94561 - 2940
County 7

Gepaid: CAD009151671
TSD EPA ID: CAT000646117
Gen County: 7
Tsd County: Kings
Tons: .1000
Waste Category: Waste oil and mixed oil
Disposal Method: Not reported
Contact: E I DUPONT DE NEMOURS & CO INC
Telephone: (302) 774-1000
Mailing Address: 6000 BRIDGEHEAD RD
OAKLEY, CA 94561 - 2940
County 7

Click this hyperlink while viewing on your computer to access
196 additional CA HAZNET record(s) in the EDR Site Report.

SLIC Region 5:
Facility Status: RI, REM
Pollutant: PCE,TCE, DCE, other VOCs, Pb, As, benzene, freon 113 Unit: Facility is a Spill or site
Report Date: / / Date Filed: / /
Lead Agency: DTSC
Date Added: Not reported
Date Closed: Not reported

Facility Status: Remediation Underway
Pollutant: Metals, VOCs Unit: Facility is a Spill or site
Report Date: / / Date Filed: / /
Lead Agency: DTSC/DLL
Date Added: 10/25/2004
Date Closed: Not reported

WDS:
Facility ID: 5S 071016773
Facility Contact BOBBY C DEAVER Facility Telephone (925) 757-5836
SIC Code: 0 SIC Code 2: Not reported
Agency Name: E I DUPONT DE NEMOURS & CO
Agency Address: 6000 Bridgehead Rd
Oakley 94561 - 2940
Agency Contact: BOBBY C DEAVER Agency Phone: (925) 757-5836
Design Flow: 0 Million Gal/Day Baseline Flow: Not reported
Facility Type: Industrial - Facility that treats and/or disposes of liquid or semisolid wastes from any servicing, producing, manufacturing or processing operation of whatever nature, including mining, gravel washing, geothermal operations, air conditioning, ship building and repairing, oil production, storage and disposal operations, water pumping.
Facility Status: Active - Any facility with a continuous or seasonal discharge that is under Waste Discharge Requirements.
Agency Type: 7
Waste Type: Not reported
Threat to Water: Not reported
Complexity: Category C - Facilities having no waste treatment systems, such as cooling water dischargers or thosewho must comply through best management practices, facilities with passive waste treatment and disposal systems, such as septic systems with subsurface disposal, or dischargers having waste storage systems with land disposal such as dairy waste ponds.
Reclamation: Not reported
POTW: Not reported

E I DUPONT DE NEMOURS & COMPANY INC (Continued) **S104573837**

NPDES Number: CAS000001 The 1st 2 characters designate the state. The remaining 7 are assigned by the Regional Board
Subregion: 0

Contra Costa SL:
Facility ID: 708471
Region: CONTRA COSTA
Facility Status: ACTIVE
Inactive Date: Not reported
Tier: Not reported
Program Status:
UST: Not reported
HWG: Yes
HMMP: Not reported
AGT: Not reported
ARP: Not reported
Generator Fee Item: Not reported

EMISSIONS :
Year : 1999
Facility ID : 21
Air District Code : BA
SIC Code : 2869
Air Basin : SF
Air District Name : BAY AREA AQMD
Community Health Air Pollution Info System : Not reported
Consolidated Emission Reporting Rule : Not reported
County Code : 7
County ID : 7
Total Organic Hydrocarbon Gases Tons/Yr: 3
Reactive Organic Gases Tons/Yr: 2
Carbon Monoxide Emissions Tons/Yr: 0
NOX - Oxides of Nitrogen Tons/Yr: 0
SOX - Oxides of Sulphur Tons/Yr: 0
Particulate Matter Tons/Yr : 0
Part. Matter 10 Micrometers and Smaller Tons/Yr : 0

Year : 2000
Facility ID : 21
Air District Code : BA
SIC Code : 2869
Air Basin : SF
Air District Name : BAY AREA AQMD
Community Health Air Pollution Info System : Not reported
Consolidated Emission Reporting Rule : Not reported
County Code : 7
County ID : 7
Total Organic Hydrocarbon Gases Tons/Yr: 3
Reactive Organic Gases Tons/Yr: 2
Carbon Monoxide Emissions Tons/Yr: 0
NOX - Oxides of Nitrogen Tons/Yr: 0
SOX - Oxides of Sulphur Tons/Yr: 0
Particulate Matter Tons/Yr : 0
Part. Matter 10 Micrometers and Smaller Tons/Yr : 0

Year : 2001
Facility ID : 21
Air District Code : BA

E I DUPONT DE NEMOURS & COMPANY INC (Continued) **S104573837**

SIC Code : 3559
Air Basin : SF
Air District Name : BAY AREA AQMD
Community Health Air Pollution Info System : Not reported
Consolidated Emission Reporting Rule : Not reported
County Code : 7
County ID : 7
Total Organic Hydrocarbon Gases Tons/Yr: 5
Reactive Organic Gases Tons/Yr: 4
Carbon Monoxide Emissions Tons/Yr: 0
NOX - Oxides of Nitrogen Tons/Yr: 0
SOX - Oxides of Sulphur Tons/Yr: 0
Particulate Matter Tons/Yr : 0
Part. Matter 10 Micrometers and Smaller Tons/Yr : 0

D17 **ANTIOCH FACILITY** **CHMIRS** **S101310468**
NNW **6000 BRIDGEHEAD RD** **WMUDS/SWAT** **N/A**
1/4-1/2 **ANTIOCH CA, CA 94509** **EMI**
2386 ft. **SWEEPS UST**

Site 5 of 5 in cluster D

Relative:
Lower

Actual:
21 ft.

WMUDS:
Region: 5S
Date of Last Facility Edit: Not reported
Last Facility Editors: Not reported
Waste Discharge System ID: 5B072038001
Solid Waste Information ID: Not reported
Waste Discharge System: True
Solid Waste Assessment Test Program: False
Facility Name: Not reported
Toxic Pits Cleanup Act Program: False
Resource Conservation Recovery Act Program: True
Department of Defense: False
Open to Public: False
Number of WMUDS at Facility: 1
Facility Telephone: Not reported
Primary Standard Industrial Classification: 2816
Secondary Standard Industrial Classification: Not reported
Solid Waste Assessment Test Program Name: Not reported
NPID: CA0004936
Tonnage: 0
Regional Board ID: Not reported
Municipal Solid Waste: False
Superorder: False
Sub Chapter 15: True
Reg. Board Project Officer: RJ
Section Range: Not reported
RCRA Facility: Yes
Waste Discharge Requirements: A
Base Meridian: Not reported
Waste List: False
Facility Description: Not reported
Self-Monitoring Rept. Frequency: Monthly Submittal
Threat to Water Quality:
Moderate Threat to Water Quality. A violation could have a major adverse impact on receiving biota, can cause aesthetic impairment to a significant human population, or render unusable a potential domestic or municipal water supply. Awsthetic impairment would include nuisance from a waste treatment facility.

ANTIOCH FACILITY (Continued) **S101310468**

Facility Type:	Industrial - Facility that treats and/or disposes of liquid or semisolid wastes from any servicing, producing, manufacturing or processing operation of whatever nature, including mining, gravel washing, geothermal operations, air conditioning, ship building and repairing, oil production, storage and disposal operations, water pumping.
Complexity:	Category A - Any major NPDES facility, any non-NPDES facility (particularly those with toxic wastes) that would be a major if discharge was made to surface or ground waters, or any Class I disposal site. Includes any small-volume complex facility (particularly those with toxicwastes) with numerous discharge points, leak detection systems or ground water monitoring wells.
Prime Waste:	Process Waste (Waste produced as part of the industrial/manufacturing process) - Designated/Influent or Solid Wastes that pose a significant threat to water quality because of their high concentrations (E.G., BOD, Hardness, TRF, Chloride). 'Manageable' hazardous wastes (E.G., inorganic salts and heavy metals) are included in this category.
2nd Waste Type:	Domestic Sewage - Designated/Influent or Solid Wastes that pose a significant threat to water quality because of their high concentrations (E.G., BOD, Hardness, TRF, Chloride). 'Manageable' hazardous wastes (E.G., inorganic salts and heavy metals) are included in this category.
Agency:	E.I. DU PONT DE NEMOURS & CO.
Address:	6000 BRIDGEHEAD RD ANTIOCH CA 94509
Department:	Not reported
Contact:	ROBERT DOREMUS, JR.
Telephone:	(925) 779-6265
Type:	Private
Landowner:	Not reported
Address:	Not reported
Telephone:	Not reported
Contact:	Not reported

CHMIRS:

OES Control Number:	009953
Chemical Name:	sodium hydroxide solution
Extent of Release:	Not reported
Property Use:	Not reported
Incident Date:	Not reported
Date Completed:	Not reported
Time Completed :	Not reported
Agency Id Number :	Not reported
Agency Incident Number :	Not reported
OES Incident Number :	009953
Time Notified :	Not reported
Surrounding Area :	Not reported
Estimated Temperature :	Not reported
Property Management :	Not reported
More Than Two Substances Involved? :	Not reported
Special Studies 1 :	Not reported
Special Studies 2 :	Not reported
Special Studies 3 :	Not reported
Special Studies 4 :	Not reported
Special Studies 5 :	Not reported
Special Studies 6 :	Not reported
Responding Agency Personel # Of Injuries :	Not reported
Responding Agency Personel # Of Fatalities :	NO

ANTIOCH FACILITY (Continued) **S101310468**

Resp Agncy Personel # Of Decontaminated : Not reported
Others Number Of Decontaminated : Not reported
Others Number Of Injuries : Not reported
Others Number Of Fatalities : Not reported
Vehicle Make/year : Not reported
Vehicle License Number : Not reported
Vehicle State : Not reported
Vehicle Id Number : Not reported
CA/DOT/PUC/ICC Number : Not reported
Company Name : Not reported
Reporting Officer Name/ID : Not reported
Report Date : Not reported
Comments : Not reported
Facility Telephone Number : Not reported
Waterway Involved : YES
Waterway : Not reported
Spill Site : OTHER
Cleanup By : dupont
Containment : NO
What Happened : Not reported
Type : CHEMICAL
Other : Not reported
Chemical 1 : Not Reported
Chemical 2 : Not Reported
Chemical 3 : Not Reported
Date/Time : Not reported
Evacuations : NO
True date : 12/31/03
Year : 1995
Agency : private cit.
BBLS : Not reported
Cups : Not reported
CUFT : Not reported
Gallons : Not reported
Grams : Not reported
Pounds : Not reported
Liters : Not reported
Ounces : Not reported
Pints : Not reported
Quarts : Not reported
Sheen : Not reported
Tons : Not reported
Unknown : Not reported
Description : electricity shutoff caused water valve to open causing an overflow.
Incident date : 9/9/95 1500
Admin Agency : Not reported
OES date : 9/9/1995
OES time : 09:59:23 PM
Amount : 400 lbs.

SWEEPS:
Status : A
Comp Number : 8471
Number : 1
Board Of Equalization : 44-002213
Ref Date : 02-11-92
Act Date : 02-11-92

ANTIOCH FACILITY (Continued) **S101310468**

Created Date : 07-22-88
Tank Status : A
Owner Tank Id : 203
Swrcb Tank Id : 07-000-008471-000001
Actv Date : 02-11-92
Capacity : 200
Tank Use : CHEMICAL
Stg : P
Content : CL2 F2 CH4
Number Of Tanks : 2

Status : A
Comp Number : 8471
Number : 1
Board Of Equalization : 44-002213
Ref Date : 02-11-92
Act Date : 02-11-92
Created Date : 07-22-88
Tank Status : A
Owner Tank Id : 407
Swrcb Tank Id : 07-000-008471-000007
Actv Date : 02-11-92
Capacity : 2500
Tank Use : M.V. FUEL
Stg : P
Content : REG UNLEADED
Number Of Tanks : Not reported

EMISSIONS :
Year : 1990
Facility ID : 21
Air District Code : BA
SIC Code : 2816
Air Basin : SF
Air District Name : BAY AREA AQMD
Community Health Air Pollution Info System : Not reported
Consolidated Emission Reporting Rule : Not reported
County Code : 7
County ID : 7
Total Organic Hydrocarbon Gases Tons/Yr: 43
Reactive Organic Gases Tons/Yr: 36
Carbon Monoxide Emissions Tons/Yr: 9151
NOX - Oxides of Nitrogen Tons/Yr: 54
SOX - Oxides of Sulphur Tons/Yr: 0
Particulate Matter Tons/Yr : 25
Part. Matter 10 Micrometers and Smaller Tons/Yr : 21

Year : 1993
Facility ID : 21
Air District Code : BA
SIC Code : 2816
Air Basin : SF
Air District Name : BAY AREA AQMD
Community Health Air Pollution Info System : Not reported
Consolidated Emission Reporting Rule : Not reported
County Code : 7
County ID : 7
Total Organic Hydrocarbon Gases Tons/Yr: 33

ANTIOCH FACILITY (Continued) **S101310468**

Reactive Organic Gases Tons/Yr: 29
Carbon Monoxide Emissions Tons/Yr: 9548
NOX - Oxides of Nitrogen Tons/Yr: 55
SOX - Oxides of Sulphur Tons/Yr: 0
Particulate Matter Tons/Yr : 26
Part. Matter 10 Micrometers and Smaller Tons/Yr : 23

Year : 1995
Facility ID : 21
Air District Code : BA
SIC Code : 2816
Air Basin : SF
Air District Name : BAY AREA AQMD
Community Health Air Pollution Info System : Not reported
Consolidated Emission Reporting Rule : Not reported
County Code : 7
County ID : 7
Total Organic Hydrocarbon Gases Tons/Yr: 21
Reactive Organic Gases Tons/Yr: 17
Carbon Monoxide Emissions Tons/Yr: 9165
NOX - Oxides of Nitrogen Tons/Yr: 55
SOX - Oxides of Sulphur Tons/Yr: 0
Particulate Matter Tons/Yr : 16
Part. Matter 10 Micrometers and Smaller Tons/Yr : 14

Year : 1996
Facility ID : 21
Air District Code : BA
SIC Code : 2816
Air Basin : SF
Air District Name : BAY AREA AQMD
Community Health Air Pollution Info System : Not reported
Consolidated Emission Reporting Rule : Not reported
County Code : 7
County ID : 7
Total Organic Hydrocarbon Gases Tons/Yr: 48
Reactive Organic Gases Tons/Yr: 40
Carbon Monoxide Emissions Tons/Yr: 9168
NOX - Oxides of Nitrogen Tons/Yr: 71
SOX - Oxides of Sulphur Tons/Yr: 1
Particulate Matter Tons/Yr : 8
Part. Matter 10 Micrometers and Smaller Tons/Yr : 8

Year : 1997
Facility ID : 21
Air District Code : BA
SIC Code : 2816
Air Basin : SF
Air District Name : BAY AREA AQMD
Community Health Air Pollution Info System : Not reported
Consolidated Emission Reporting Rule : Not reported
County Code : 7
County ID : 7
Total Organic Hydrocarbon Gases Tons/Yr: 23
Reactive Organic Gases Tons/Yr: 19
Carbon Monoxide Emissions Tons/Yr: 6974
NOX - Oxides of Nitrogen Tons/Yr: 43

ANTIOCH FACILITY (Continued) **S101310468**

SOX - Oxides of Sulphur Tons/Yr: 0
Particulate Matter Tons/Yr : 6
Part. Matter 10 Micrometers and Smaller Tons/Yr : 6

Year : 1998
Facility ID : 21
Air District Code : BA
SIC Code : 2869
Air Basin : SF
Air District Name : BAY AREA AQMD
Community Health Air Pollution Info System : Not reported
Consolidated Emission Reporting Rule : Not reported
County Code : 7
County ID : 7
Total Organic Hydrocarbon Gases Tons/Yr: 3
Reactive Organic Gases Tons/Yr: 3
Carbon Monoxide Emissions Tons/Yr: 0
NOX - Oxides of Nitrogen Tons/Yr: 0
SOX - Oxides of Sulphur Tons/Yr: 0
Particulate Matter Tons/Yr : 0
Part. Matter 10 Micrometers and Smaller Tons/Yr : 0

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18 **WASTE FIBER RECOVERY** **SLIC** **S100858306**
West **HWY 4** **CONTRA COSTA CO. SITE LIST** **N/A**
1/4-1/2 **ANTIOCH, CA 94509**
2588 ft.

Relative:
Higher

Actual:
36 ft.

CA STATE SLIC :
Global Id : SL0601370344
Region : STATE
Assigned Name : SLICSITE
Lead Agency Contact : C. DEAN HUBBARD
Lead Agency : CENTRAL VALLEY RWQCB (REGION 5F)
Lead Agency Case Number : 1862300
Responsible Party : Not reported
Recent Dtw : Not reported
Facility Status : Not reported
Substance Released : 128, PET

Contra Costa SL:
Facility ID: 771286
Region: CONTRA COSTA
Facility Status: INACTIVE
Inactive Date: 1992-04-07 00:00:00
Tier: Not reported
Program Status:
  UST: X
  HWG: Not reported
  HMMP: Not reported
  AGT: Not reported
  ARP: Not reported
Generator Fee Item: Not reported

19 **WNW** **1/2-1** **4032 ft.**	**CONTRA COSTA POWER PLANT** **3201 WILBUR AVE** **ANTIOCH, CA 94509**	**RCRA-LQG** **RCRA-TSDF** **RAATS** **CORRACTS** **AST** **CERC-NFRAP** **CA WDS**	**1000196257** **CAT080011489**
Relative: **Lower**			
Actual: **14 ft.**			

CERCLIS-NFRAP Classification Data:
Federal Facility: Not a Federal Facility
Non NPL Code: NFRAP
NPL Status: Not on the NPL
CERCLIS-NFRAP Assessment History:
Assessment: DISCOVERY Completed: 10/01/1979
Assessment: RCRA FACILITY ASSESSMENT Completed: 09/25/1986
Assessment: PRELIMINARY ASSESSMENT Completed: 12/01/1986
Assessment: SITE INSPECTION Completed: 12/01/1986
Assessment: ARCHIVE SITE Completed: 10/11/1991
Assessment: SITE INSPECTION Completed: 10/11/1991
CERCLIS-NFRAP Alias Name(s):
PG&E

CORRACTS Data:

EPA Id: CAT080011489
Region: 9
Area Name: ENTIRE FACILITY
Actual Date: 12/01/1986
Corrective Action: CA075LO - CA Prioritization, Facility or area was assigned a low corrective action priority
2002 NAICS Title: Not Reported

RCRAInfo Corrective Action Summary:
Event: CA Prioritization, Facility or area was assigned a low corrective action priority.
Event Date: 12/01/1986

RCRAInfo:
Owner: PACIFIC GAS AND ELECTRIC COMPANY
(415) 972-2733
EPA ID: CAT080011489

Contact: Not reported

Classification: Large Quantity Generator, TSDF
TSDF Activities: Not reported

Violation Status: Violations exist

Regulation Violated: 264.140-150.H
Area of Violation: TSD-FINANCIAL RESPONSIBILITY REQUIREMENTS
Date Violation Determined: 06/24/1992
Actual Date Achieved Compliance: 10/13/1992

Enforcement Action: WRITTEN INFORMAL
Enforcement Action Date: 08/12/1987
Penalty Type: Not reported

Regulation Violated: 270
Area of Violation: TSD-OTHER REQUIREMENTS (OVERSIGHT)
Date Violation Determined: 02/23/1989
Actual Date Achieved Compliance: 08/05/1991

Enforcement Action: WRITTEN INFORMAL

CONTRA COSTA POWER PLANT (Continued) **1000196257**

Enforcement Action Date:	04/05/1989
Penalty Type:	Not reported
Regulation Violated:	264.90-94.F
Area of Violation:	TSD-GOUNDWATER MONITORING REQUIREMENTS
Date Violation Determined:	12/08/1987
Actual Date Achieved Compliance:	01/18/1988
Enforcement Action:	FINAL 3008(H) I.S. CA ORDERS (NON-HSWA)
Enforcement Action Date:	09/15/1989
Penalty Type:	Not reported
Regulation Violated:	270
Area of Violation:	TSD-OTHER REQUIREMENTS (OVERSIGHT)
Date Violation Determined:	11/24/1987
Actual Date Achieved Compliance:	01/18/1988
Enforcement Action:	WRITTEN INFORMAL
Enforcement Action Date:	01/08/1988
Penalty Type:	Not reported
Regulation Violated:	270
Area of Violation:	TSD-OTHER REQUIREMENTS (OVERSIGHT)
Date Violation Determined:	11/25/1986
Actual Date Achieved Compliance:	08/05/1991
Enforcement Action:	WRITTEN INFORMAL
Enforcement Action Date:	08/12/1987
Penalty Type:	Not reported

There are 5 violation record(s) reported at this site:

Evaluation	Area of Violation	Date of Compliance
Financial Record Review	TSD-FINANCIAL RESPONSIBILITY REQUIREMENTS	19921013
Compliance Evaluation Inspection	TSD-OTHER REQUIREMENTS (OVERSIGHT)	19910805
Compliance GW Monitoring Evaluation	TSD-GOUNDWATER MONITORING REQUIREMENTS	19880118
Compliance Evaluation Inspection	TSD-OTHER REQUIREMENTS (OVERSIGHT)	19880118
Compliance Evaluation Inspection	TSD-OTHER REQUIREMENTS (OVERSIGHT)	19910805

WDS:

Facility ID:	5S 07I016482		
Facility Contact	STEVEN BAUMAN	Facility Telephone	(925) 779-6500
SIC Code:	0	SIC Code 2:	Not reported
Agency Name:	MIRANT DELTA LLC		
Agency Address:	3201 WILBUR AVE ANTIOCH 94509		
Agency Contact:	STEVE BAUMAN	Agency Phone:	(925) 779-6500
Design Flow:	0 Million Gal/Day	Baseline Flow:	Not reported
Facility Type:	Industrial - Facility that treats and/or disposes of liquid or semisolid wastes from any servicing, producing, manufacturing or processing operation of whatever nature, including mining, gravel washing, geothermal operations, air conditioning, ship building and repairing, oil production, storage and disposal operations, water pumping.		
Facility Status:	Active - Any facility with a continuous or seasonal discharge that is under Waste Discharge Requirements.		
Agency Type:	7		
Waste Type:	Not reported		
Threat to Water:	Not reported		
Complexity:	Category C - Facilities having no waste treatment systems, such as cooling water dischargers or thosewho must comply through best management practices, facilities with passive waste treatment and disposal systems, such as septic systems with subsurface		

CONTRA COSTA POWER PLANT (Continued) **1000196257**

	disposal, or dischargers having waste storage systems with land disposal such as dairy waste ponds.
Reclamation:	Not reported
POTW:	Not reported
NPDES Number:	CAS000001 The 1st 2 characters designate the state. The remaining 7 are assigned by the Regional Board
Subregion:	0

AST:

Owner:	MIRANT DELTA LLC
Total Gallons:	5942916

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
ANTIOCH	S106931820	SAN JOAQUIN YACHT HARBOR	RT 1 BOX 566	94509	SWEEPS UST
ANTIOCH	S102259942	BRIDGEHEAD TRUCK STOP	RT 1, BOX 495	94509	CONTRA COSTA CO. SITE LIST
ANTIOCH	S106932144	SHERMAN ISL. DEHYDRATOR-ODORAN	HIGHWAY 160	94509	SWEEPS UST
ANTIOCH	1003878987	ABANDONED DRUM/ANTIOCH	ANTIOCH	94509	CERC-NFRAP
ANTIOCH	S101623500	BRIDGEHEAD TRUCK STOP	RT-1 BOX	94509	CA FID UST
ANTIOCH	S102259858	SWAFFORD STORAGE	BRIDGEHEAD RD, FOOT OF	94509	CONTRA COSTA CO. SITE LIST
ANTIOCH	U003784323	DELTA DIABLO SAN DIST/ANTIOCH	BRIDGEHEAD PUMP STATION	94509	UST
ANTIOCH	S106666501	CHEVRON STATION #96946	BRIDGEHEAD RD / HWY 4	94509	CONTRA COSTA CO. SITE LIST
ANTIOCH	S101581090	DELTA DIABLO ANTIOCH PUMP STA	FULTON SHIPYARD RD	94509	CHMIRS, CA FID UST, CONTRA COS CO. SITE LIST, SWEEPS UST
ANTIOCH	1000252416	CALIFORNIA ORGANICS	445 A OLD HWY 4	94509	RCRA-SQG, FINDS
ANTIOCH	1003878417	ANTIOCH DSPL SITE	PASO CORTO & SOMERSVILLE RDS	94509	CERC-NFRAP
OAKLEY	S102261431	MCKINNEY, EMILE E	RT 1, BOX 172	94561	CONTRA COSTA CO. SITE LIST
OAKLEY	S102261432	LUCCHESI, ROY & RAPLH	RT 1, BOX 253	94561	CONTRA COSTA CO. SITE LIST
OAKLEY	S102261435	STONEBARGER RANCH	RT 1, BOX 339	94561	CONTRA COSTA CO. SITE LIST
OAKLEY	S103464381	LUCCHESI, GUIDO	RT 1, BOX 298	94561	CONTRA COSTA CO. SITE LIST
OAKLEY	S106568069	CARPENTER ROAD SCHOOL	1629 / 1541 CARPENTER ROAD	94561	SCH
OAKLEY	S103172299	JOHNSON, ELMER	RT 2, BOX 181	94561	CONTRA COSTA CO. SITE LIST
OAKLEY	S103894558	BALDOCCHI, EVO	RT 2, BOX 187	94561	CONTRA COSTA CO. SITE LIST
OAKLEY	S104162235	WINDSWEPT LIVESTOCK CO	RT 2, BOX 481A	94561	CONTRA COSTA CO. SITE LIST
OAKLEY	S106926570	GAS MACHINE	5540 HWY 4 / BRIDGEHEAD RD	94561	SWEEPS UST
OAKLEY	S106929309	MELLO'S SHEET METAL	HWY 4 AT BRIDGEHEAD	94561	SWEEPS UST
OAKLEY	S105850336	MARQUEZ ENERGY LLC	HWY 4/SUNSET AVE	94561	CONTRA COSTA CO. SITE LIST
OAKLEY	1004677684	ARCO FACILITY NO 06301	5540 BRIDGEHEAD	94561	RCRA-SQG, FINDS, HAZNET
OAKLEY	S105628393	CYPRESS ROAD NEW ELEMENTARY SCHOOL	CYPRESS ROAD/HIGHWAY 4	94561	SCH
OAKLEY	U003937357	7-ELEVEN STORE #32787	EMPIRE RD/HWY 4	94561	UST
OAKLEY	S106568162	CYPRESS ROAD SCHOOL	4901 FRANK HENGEL WAY	94561	SCH
OAKLEY	1000283390	OAKLEY ONE HR CLEANERS	231 MAIN ST	94561	RCRA-SQG, FINDS, HAZNET, CLEANERS
OAKLEY	S102261402	CAL TRANS OAKLEY	201 MAIN ST	94561	CONTRA COSTA CO. SITE LIST
OAKLEY	U001597824	SANTA FE SERVICE STATION	407 MAIN ST.	94561	HIST UST
OAKLEY	S100223761	A & A MARKET (FORMER)	407 MAIN ST	94561	LUST, Cortese, CONTRA COSTA CO. SITE LIST, SWEEPS UST
OAKLEY	S106930066	OAKLEY BUILDERS SUPPLY	800 MAIN ST HWY 4	94561	SWEEPS UST
OAKLEY	S102261414	WAPA/CC SUBSTATION #4	NEROLY RD	94561	CONTRA COSTA CO. SITE LIST
OAKLEY	S106924890	CONTRA COSTA WATER DISTRICT	NEROLY RD	94561	SWEEPS UST
OAKLEY	1005904279	CHEVRON STATION NO 93801	5433 NEROLY RD AND HWY 4	94561	RCRA-SQG, FINDS
OAKLEY	1001459705	P G AND E DUTCH SLOUGH DEHYDRATOR	OAKLEY RD AND HWY 4	94561	RCRA-SQG, FINDS, HAZNET
OAKLEY	S102261425	SHOSHONE OIL CORPORATION	OAKLEY GAS FIELD-HWY 4	94561	CONTRA COSTA CO. SITE LIST
OAKLEY	S102261448	WESTERN CONT'L NGC-KYSH-1	SUNSET/HWY 4	94561	CONTRA COSTA CO. SITE LIST

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Elapsed ASTM days: Provides confirmation that this EDR report meets or exceeds the 90-day updating requirement of the ASTM standard.

FEDERAL ASTM STANDARD RECORDS

NPL: National Priority List
Source: EPA
Telephone: N/A
National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 07/01/05	Date of Data Arrival at EDR: 08/03/05
Date Made Active at EDR: 08/22/05	Elapsed ASTM days: 19
Database Release Frequency: Quarterly	Date of Last EDR Contact: 08/03/05

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 3
Telephone 215-814-5418

EPA Region 4
Telephone 404-562-8033

EPA Region 6
Telephone: 214-655-6659

EPA Region 8
Telephone: 303-312-6774

Proposed NPL: Proposed National Priority List Sites
Source: EPA
Telephone: N/A

Date of Government Version: 04/27/05	Date of Data Arrival at EDR: 05/04/05
Date Made Active at EDR: 05/16/05	Elapsed ASTM days: 12
Database Release Frequency: Quarterly	Date of Last EDR Contact: 08/05/05

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System
Source: EPA
Telephone: 703-413-0223
CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 06/27/05	Date of Data Arrival at EDR: 07/22/05
Date Made Active at EDR: 08/17/05	Elapsed ASTM days: 26
Database Release Frequency: Quarterly	Date of Last EDR Contact: 07/22/05

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned
Source: EPA
Telephone: 703-413-0223
As of February 1995, CERCLIS sites designated "No Further Remedial Action Planned" (NFRAP) have been removed from CERCLIS. NFRAP sites may be sites where, following an initial investigation, no contamination was found, contamination was removed quickly without the need for the site to be placed on the NPL, or the contamination was not serious enough to require Federal Superfund action or NPL consideration. EPA has removed approximately 25,000 NFRAP sites to lift the unintended barriers to the redevelopment of these properties and has archived them as historical records so EPA does not needlessly repeat the investigations in the future. This policy change is part of the EPA's Brownfields Redevelopment Program to help cities, states, private investors and affected citizens to promote economic redevelopment of unproductive urban sites.

Date of Government Version: 05/17/05
Date Made Active at EDR: 08/17/05
Database Release Frequency: Quarterly

Date of Data Arrival at EDR: 06/20/05
Elapsed ASTM days: 58
Date of Last EDR Contact: 06/20/05

CORRACTS: Corrective Action Report
Source: EPA
Telephone: 800-424-9346
CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 06/28/05
Date Made Active at EDR: 08/08/05
Database Release Frequency: Quarterly

Date of Data Arrival at EDR: 07/05/05
Elapsed ASTM days: 34
Date of Last EDR Contact: 06/05/05

RCRA: Resource Conservation and Recovery Act Information
Source: EPA
Telephone: 800-424-9346
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRAInfo replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS). The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month. Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month. Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month. Transporters are individuals or entities that move hazardous waste from the generator off-site to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 05/20/05
Date Made Active at EDR: 06/09/05
Database Release Frequency: Quarterly

Date of Data Arrival at EDR: 05/24/05
Elapsed ASTM days: 16
Date of Last EDR Contact: 08/23/05

ERNS: Emergency Response Notification System
Source: National Response Center, United States Coast Guard
Telephone: 202-260-2342
Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 12/31/04
Date Made Active at EDR: 03/24/05
Database Release Frequency: Annually

Date of Data Arrival at EDR: 01/27/05
Elapsed ASTM days: 56
Date of Last EDR Contact: 07/25/05

FEDERAL ASTM SUPPLEMENTAL RECORDS

BRS: Biennial Reporting System
Source: EPA/NTIS
Telephone: 800-424-9346
The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/03
Database Release Frequency: Biennially

Date of Last EDR Contact: 06/17/05
Date of Next Scheduled EDR Contact: 09/12/05

CONSENT: Superfund (CERCLA) Consent Decrees
Source: Department of Justice, Consent Decree Library
Telephone: Varies
Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 12/14/04	Date of Last EDR Contact: 07/25/05
Database Release Frequency: Varies	Date of Next Scheduled EDR Contact: 10/24/05

ROD: Records Of Decision
Source: EPA
Telephone: 703-416-0223
Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 06/08/05	Date of Last EDR Contact: 07/06/05
Database Release Frequency: Annually	Date of Next Scheduled EDR Contact: 10/03/05

DELISTED NPL: National Priority List Deletions
Source: EPA
Telephone: N/A
The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 07/01/05	Date of Last EDR Contact: 08/03/05
Database Release Frequency: Quarterly	Date of Next Scheduled EDR Contact: 10/31/05

FINDS: Facility Index System/Facility Registry System
Source: EPA
Telephone: (415) 947-8000
Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 07/11/05	Date of Last EDR Contact: 07/05/05
Database Release Frequency: Quarterly	Date of Next Scheduled EDR Contact: 10/03/05

HMIRS: Hazardous Materials Information Reporting System
Source: U.S. Department of Transportation
Telephone: 202-366-4555
Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 06/27/05	Date of Last EDR Contact: 07/22/05
Database Release Frequency: Annually	Date of Next Scheduled EDR Contact: 10/17/05

MLTS: Material Licensing Tracking System
Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 07/14/05	Date of Last EDR Contact: 07/05/05
Database Release Frequency: Quarterly	Date of Next Scheduled EDR Contact: 10/03/05

MINES: Mines Master Index File
Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 05/13/05
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 06/27/05
Date of Next Scheduled EDR Contact: 09/26/05

NPL LIENS: Federal Superfund Liens
Source: EPA
Telephone: 202-564-4267
Federal Superfund Liens. Under the authority granted the USEPA by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner receives notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/91
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 08/22/05
Date of Next Scheduled EDR Contact: 11/21/05

PADS: PCB Activity Database System
Source: EPA
Telephone: 202-564-3887
PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 03/30/05
Database Release Frequency: Annually
Date of Last EDR Contact: 08/25/05
Date of Next Scheduled EDR Contact: 11/07/05

DOD: Department of Defense Sites
Source: USGS
Telephone: 703-692-8801
This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 10/01/03
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 08/09/05
Date of Next Scheduled EDR Contact: 11/07/05

UMTRA: Uranium Mill Tailings Sites
Source: Department of Energy
Telephone: 505-845-0011
Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized. In 1978, 24 inactive uranium mill tailings sites in Oregon, Idaho, Wyoming, Utah, Colorado, New Mexico, Texas, North Dakota, South Dakota, Pennsylvania, and on Navajo and Hopi tribal lands, were targeted for cleanup by the Department of Energy.

Date of Government Version: 12/29/04
Database Release Frequency: Varies
Date of Last EDR Contact: 07/05/05
Date of Next Scheduled EDR Contact: 09/19/05

ODI: Open Dump Inventory
Source: Environmental Protection Agency
Telephone: 800-424-9346
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/85
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 05/23/95
Date of Next Scheduled EDR Contact: N/A

FUDS: Formerly Used Defense Sites
Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 12/31/04
Database Release Frequency: Varies
Date of Last EDR Contact: 06/29/05
Date of Next Scheduled EDR Contact: 10/03/05

INDIAN RESERV: Indian Reservations
Source: USGS
Telephone: 202-208-3710
This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 10/01/03
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 08/09/05
Date of Next Scheduled EDR Contact: 11/07/05

US ENG CONTROLS: Engineering Controls Sites List
Source: Environmental Protection Agency
Telephone: 703-603-8867
A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 01/10/05
Database Release Frequency: Varies
Date of Last EDR Contact: 07/05/05
Date of Next Scheduled EDR Contact: 10/03/05

RAATS: RCRA Administrative Action Tracking System
Source: EPA
Telephone: 202-564-4104
RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/95
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 06/06/05
Date of Next Scheduled EDR Contact: 09/05/05

TRIS: Toxic Chemical Release Inventory System
Source: EPA
Telephone: 202-566-0250
Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/03
Database Release Frequency: Annually
Date of Last EDR Contact: 07/13/05
Date of Next Scheduled EDR Contact: 09/19/05

TSCA: Toxic Substances Control Act
Source: EPA
Telephone: 202-260-5521
Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/02
Database Release Frequency: Every 4 Years
Date of Last EDR Contact: 07/18/05
Date of Next Scheduled EDR Contact: 10/17/05

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
Source: EPA
Telephone: 202-566-1667

Date of Government Version: 07/15/05
Database Release Frequency: Quarterly
Date of Last EDR Contact: 06/20/05
Date of Next Scheduled EDR Contact: 09/19/05

SSTS: Section 7 Tracking Systems
Source: EPA
Telephone: 202-564-4203
Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/03	Date of Last EDR Contact: 07/18/05
Database Release Frequency: Annually	Date of Next Scheduled EDR Contact: 10/17/05

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 07/15/05	Date of Last EDR Contact: 06/20/05
Database Release Frequency: Quarterly	Date of Next Scheduled EDR Contact: 09/19/05

STATE OF CALIFORNIA ASTM STANDARD RECORDS

AWP: Annual Workplan Sites
Source: California Environmental Protection Agency
Telephone: 916-323-3400
Known Hazardous Waste Sites. California DTSC's Annual Workplan (AWP), formerly BEP, identifies known hazardous substance sites targeted for cleanup.

Date of Government Version: 05/04/05	Date of Data Arrival at EDR: 06/01/05
Date Made Active at EDR: 06/29/05	Elapsed ASTM days: 28
Database Release Frequency: Annually	Date of Last EDR Contact: 06/01/05

CAL-SITES: Calsites Database
Source: Department of Toxic Substance Control
Telephone: 916-323-3400
The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database.

Date of Government Version: 05/04/05	Date of Data Arrival at EDR: 06/01/05
Date Made Active at EDR: 06/29/05	Elapsed ASTM days: 28
Database Release Frequency: Quarterly	Date of Last EDR Contact: 06/01/05

CHMIRS: California Hazardous Material Incident Report System
Source: Office of Emergency Services
Telephone: 916-845-8400
California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

Date of Government Version: 12/31/03	Date of Data Arrival at EDR: 05/18/04
Date Made Active at EDR: 06/25/04	Elapsed ASTM days: 38
Database Release Frequency: Varies	Date of Last EDR Contact: 08/22/05

CORTESE: "Cortese" Hazardous Waste & Substances Sites List
Source: CAL EPA/Office of Emergency Information
Telephone: 916-323-9100
The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites). This listing is no longer updated by the state agency.

Date of Government Version: 04/01/01
Date Made Active at EDR: 07/26/01
Database Release Frequency: No Update Planned
Date of Data Arrival at EDR: 05/29/01
Elapsed ASTM days: 58
Date of Last EDR Contact: 07/26/05

NOTIFY 65: Proposition 65 Records
Source: State Water Resources Control Board
Telephone: 916-445-3846
Proposition 65 Notification Records. NOTIFY 65 contains facility notifications about any release which could impact drinking water and thereby expose the public to a potential health risk.

Date of Government Version: 10/21/93
Date Made Active at EDR: 11/19/93
Database Release Frequency: No Update Planned
Date of Data Arrival at EDR: 11/01/93
Elapsed ASTM days: 18
Date of Last EDR Contact: 07/19/05

TOXIC PITS: Toxic Pits Cleanup Act Sites
Source: State Water Resources Control Board
Telephone: 916-227-4364
Toxic PITS Cleanup Act Sites. TOXIC PITS identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

Date of Government Version: 07/01/95
Date Made Active at EDR: 09/26/95
Database Release Frequency: No Update Planned
Date of Data Arrival at EDR: 08/30/95
Elapsed ASTM days: 27
Date of Last EDR Contact: 08/01/05

SWF/LF (SWIS): Solid Waste Information System
Source: Integrated Waste Management Board
Telephone: 916-341-6320
Active, Closed and Inactive Landfills. SWF/LF records typically contain an inventory of solid waste disposal facilities or landfills. These may be active or inactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 06/13/05
Date Made Active at EDR: 07/15/05
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 06/14/05
Elapsed ASTM days: 31
Date of Last EDR Contact: 06/14/05

WMUDS/SWAT: Waste Management Unit Database
Source: State Water Resources Control Board
Telephone: 916-227-4448
Waste Management Unit Database System. WMUDS is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units. WMUDS is composed of the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, SWAT Program Information, SWAT Report Summary Information, SWAT Report Summary Data, Chapter 15 (formerly Subchapter 15) Information, Chapter 15 Monitoring Parameters, TPCA Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.

Date of Government Version: 04/01/00
Date Made Active at EDR: 05/10/00
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 04/10/00
Elapsed ASTM days: 30
Date of Last EDR Contact: 06/06/05

LUST: Geotracker's Leaking Underground Fuel Tank Report
Source: State Water Resources Control Board
Contact: Contra Costa County Health Services Dept, (925) 646-2286
Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 07/11/05
Date Made Active at EDR: 08/03/05
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 07/12/05
Elapsed ASTM days: 22
Date of Last EDR Contact: 07/12/05

LUST REG 1: Active Toxic Site Investigation
Source: California Regional Water Quality Control Board North Coast (1)
Telephone: 707-576-2220
Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/01
Date Made Active at EDR: 03/29/01
Database Release Frequency: No Update Planned
Date of Data Arrival at EDR: 02/28/01
Elapsed ASTM days: 29
Date of Last EDR Contact: 08/22/05

LUST REG 2: Fuel Leak List
Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457

Date of Government Version: 09/30/04
Date Made Active at EDR: 11/19/04
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 10/20/04
Elapsed ASTM days: 30
Date of Last EDR Contact: 07/11/05

LUST REG 3: Leaking Underground Storage Tank Database
Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147

Date of Government Version: 05/19/03
Date Made Active at EDR: 06/02/03
Database Release Frequency: No Update Planned
Date of Data Arrival at EDR: 05/19/03
Elapsed ASTM days: 14
Date of Last EDR Contact: 08/15/05

LUST REG 4: Underground Storage Tank Leak List
Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/07/04
Date Made Active at EDR: 10/12/04
Database Release Frequency: No Update Planned
Date of Data Arrival at EDR: 09/07/04
Elapsed ASTM days: 35
Date of Last EDR Contact: 06/27/05

LUST REG 5: Leaking Underground Storage Tank Database
Source: California Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291

Date of Government Version: 07/01/05
Date Made Active at EDR: 09/01/05
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 08/02/05
Elapsed ASTM days: 30
Date of Last EDR Contact: 07/08/05

LUST REG 6L: Leaking Underground Storage Tank Case Listing
Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 916-542-5424
For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/09/03
Date Made Active at EDR: 10/07/03
Database Release Frequency: No Update Planned
Date of Data Arrival at EDR: 09/10/03
Elapsed ASTM days: 27
Date of Last EDR Contact: 06/06/05

LUST REG 6V: Leaking Underground Storage Tank Case Listing
Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-346-7491

Date of Government Version: 06/07/05
Date Made Active at EDR: 06/29/05
Database Release Frequency: No Update Planned
Date of Data Arrival at EDR: 06/07/05
Elapsed ASTM days: 22
Date of Last EDR Contact: 07/08/05

LUST REG 7: Leaking Underground Storage Tank Case Listing
Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-346-7491

Date of Government Version: 02/26/04
Date Made Active at EDR: 03/24/04
Database Release Frequency: No Update Planned
Date of Data Arrival at EDR: 02/26/04
Elapsed ASTM days: 27
Date of Last EDR Contact: 06/27/05

LUST REG 8: Leaking Underground Storage Tanks
Source: California Regional Water Quality Control Board Santa Ana Region (8)
Telephone: 951-782-4130
California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/14/05
Date Made Active at EDR: 03/28/05
Database Release Frequency: Varies
Date of Data Arrival at EDR: 02/15/05
Elapsed ASTM days: 41
Date of Last EDR Contact: 08/08/05

LUST REG 9: Leaking Underground Storage Tank Report
Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980
Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 03/01/01
Date Made Active at EDR: 05/21/01
Database Release Frequency: No Update Planned
Date of Data Arrival at EDR: 04/23/01
Elapsed ASTM days: 28
Date of Last EDR Contact: 07/18/05

CA BOND EXP. PLAN: Bond Expenditure Plan
Source: Department of Health Services
Telephone: 916-255-2118
Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

Date of Government Version: 01/01/89
Date Made Active at EDR: 08/02/94
Database Release Frequency: No Update Planned
Date of Data Arrival at EDR: 07/27/94
Elapsed ASTM days: 6
Date of Last EDR Contact: 05/31/94

CA UST:

UST: Active UST Facilities
Source: SWRCB
Contact: Contra Costa County Health Services Dept, (925) 646-2286
Active UST facilities gathered from the local regulatory agencies

Date of Government Version: 07/11/05
Date Made Active at EDR: 08/11/05
Database Release Frequency: Semi-Annually
Date of Data Arrival at EDR: 07/12/05
Elapsed ASTM days: 30
Date of Last EDR Contact: 07/12/05

VCP: Voluntary Cleanup Program Properties
Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

Date of Government Version: 05/04/05
Date Made Active at EDR: 07/07/05
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 06/01/05
Elapsed ASTM days: 36
Date of Last EDR Contact: 06/01/05

INDIAN UST: Underground Storage Tanks on Indian Land
Source: EPA Region 9
Telephone: 415-972-3368

Date of Government Version: 04/18/05
Date Made Active at EDR: 05/31/05
Database Release Frequency: Varies
Date of Data Arrival at EDR: 05/16/05
Elapsed ASTM days: 15
Date of Last EDR Contact: 08/25/05

INDIAN LUST: Leaking Underground Storage Tanks on Indian Land
Source: Environmental Protection Agency
Telephone: 415-972-3372
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 06/02/05
Date Made Active at EDR: 07/01/05
Database Release Frequency: Varies
Date of Data Arrival at EDR: 06/03/05
Elapsed ASTM days: 28
Date of Last EDR Contact: 08/25/05

INDIAN LUST: Leaking Underground Storage Tanks on Indian Land
Source: EPA Region 10
Telephone: 206-553-2857
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 06/14/05
Date Made Active at EDR: 07/15/05
Database Release Frequency: Varies
Date of Data Arrival at EDR: 06/14/05
Elapsed ASTM days: 31
Date of Last EDR Contact: 08/25/05

CA FID UST: Facility Inventory Database
Source: California Environmental Protection Agency
Telephone: 916-341-5851
The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board. Refer to local/county source for current data.

Date of Government Version: 10/31/94
Date Made Active at EDR: 09/29/95
Database Release Frequency: No Update Planned
Date of Data Arrival at EDR: 09/05/95
Elapsed ASTM days: 24
Date of Last EDR Contact: 12/28/98

HIST UST: Hazardous Substance Storage Container Database
Source: State Water Resources Control Board
Telephone: 916-341-5851
The Hazardous Substance Storage Container Database is a historical listing of UST sites. Refer to local/county source for current data.

Date of Government Version: 10/15/90
Date Made Active at EDR: 02/12/91
Database Release Frequency: No Update Planned
Date of Data Arrival at EDR: 01/25/91
Elapsed ASTM days: 18
Date of Last EDR Contact: 07/26/01

SWEEPS UST: SWEEPS UST Listing
Source: State Water Resources Control Board
Telephone: N/A
Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1980?s. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

Date of Government Version: 06/01/94
Date Made Active at EDR: 08/11/05
Database Release Frequency: No Update Planned
Date of Data Arrival at EDR: 07/07/05
Elapsed ASTM days: 35
Date of Last EDR Contact: 06/03/05

STATE OF CALIFORNIA ASTM SUPPLEMENTAL RECORDS

AST: Aboveground Petroleum Storage Tank Facilities
Source: State Water Resources Control Board
Telephone: 916-341-5712
Registered Aboveground Storage Tanks.

Date of Government Version: 02/01/05	Date of Last EDR Contact: 08/16/05
Database Release Frequency: Quarterly	Date of Next Scheduled EDR Contact: 10/31/05

CLEANERS: Cleaner Facilities
Source: Department of Toxic Substance Control
Telephone: 916-327-4498
A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaner's agents; linen supply; coin-operated laundries and cleaning; drycleaning plants, except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

Date of Government Version: 04/18/05	Date of Last EDR Contact: 07/05/05
Database Release Frequency: Annually	Date of Next Scheduled EDR Contact: 10/03/05

CA WDS: Waste Discharge System
Source: State Water Resources Control Board
Telephone: 916-341-5227
Sites which have been issued waste discharge requirements.

Date of Government Version: 06/20/05	Date of Last EDR Contact: 06/20/05
Database Release Frequency: Quarterly	Date of Next Scheduled EDR Contact: 09/19/05

DEED: Deed Restriction Listing
Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Site Mitigation and Brownfields Reuse Program Facility Sites with Deed Restrictions & Hazardous Waste Management Program Facility Sites with Deed / Land Use Restriction. The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. Some sites have multiple deed restrictions. The DTSC Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners.

Date of Government Version: 08/02/05	Date of Last EDR Contact: 07/05/05
Database Release Frequency: Semi-Annually	Date of Next Scheduled EDR Contact: 10/03/05

NFA: No Further Action Determination
Source: Department of Toxic Substances Control
Telephone: 916-323-3400
This category contains properties at which DTSC has made a clear determination that the property does not pose a problem to the environment or to public health.

Date of Government Version: 05/04/05	Date of Last EDR Contact: 06/01/05
Database Release Frequency: Quarterly	Date of Next Scheduled EDR Contact: 08/29/05

EMI: Emissions Inventory Data
Source: California Air Resources Board
Telephone: 916-322-2990
Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

Date of Government Version: 12/31/03
Database Release Frequency: Varies
Date of Last EDR Contact: 07/19/05
Date of Next Scheduled EDR Contact: 10/17/05

WIP: Well Investigation Program Case List
Source: Los Angeles Water Quality Control Board
Telephone: 213-576-6726
Well Investigation Program case in the San Gabriel and San Fernando Valley area.

Date of Government Version: 07/27/05
Database Release Frequency: Varies
Date of Last EDR Contact: 07/25/05
Date of Next Scheduled EDR Contact: 10/24/05

REF: Unconfirmed Properties Referred to Another Agency
Source: Department of Toxic Substances Control
Telephone: 916-323-3400
This category contains properties where contamination has not been confirmed and which were determined as not requiring direct DTSC Site Mitigation Program action or oversight. Accordingly, these sites have been referred to another state or local regulatory agency.

Date of Government Version: 05/04/05
Database Release Frequency: Quarterly
Date of Last EDR Contact: 06/01/05
Date of Next Scheduled EDR Contact: 08/29/05

SCH: School Property Evaluation Program
Source: Department of Toxic Substances Control
Telephone: 916-323-3400
This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose.

Date of Government Version: 05/04/05
Database Release Frequency: Quarterly
Date of Last EDR Contact: 06/01/05
Date of Next Scheduled EDR Contact: 08/29/05

NFE: Properties Needing Further Evaluation
Source: Department of Toxic Substances Control
Telephone: 916-323-3400
This category contains properties that are suspected of being contaminated. These are unconfirmed contaminated properties that need to be assessed using the PEA process. PEA in Progress indicates properties where DTSC is currently conducting a PEA. PEA Required indicates properties where DTSC has determined a PEA is required, but not currently underway.

Date of Government Version: 05/04/05
Database Release Frequency: Quarterly
Date of Last EDR Contact: 06/01/05
Date of Next Scheduled EDR Contact: 08/29/05

SLIC: Statewide SLIC Cases
Source: State Water Resources Control Board
Contact: Contra Costa County Health Services Dept, (925) 646-2286
The Spills, Leaks, Investigations, and Cleanups (SLIC) listings includes unauthorized discharges from spills and leaks, other than from underground storage tanks or other regulated sites.

Date of Government Version: 07/11/05
Database Release Frequency: Varies
Date of Last EDR Contact: 07/12/05
Date of Next Scheduled EDR Contact: 10/10/05

SLIC REG 1: Active Toxic Site Investigations
Source: California Regional Water Quality Control Board, North Coast Region (1)
Telephone: 707-576-2220

Date of Government Version: 04/03/03
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 08/22/05
Date of Next Scheduled EDR Contact: 11/21/05

SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
Any contaminated site that impacts groundwater or has the potential to impact groundwater.

Date of Government Version: 09/30/04	Date of Last EDR Contact: 07/11/05
Database Release Frequency: Quarterly	Date of Next Scheduled EDR Contact: 10/10/05

SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147
Any contaminated site that impacts groundwater or has the potential to impact groundwater.

Date of Government Version: 05/16/05	Date of Last EDR Contact: 08/15/05
Database Release Frequency: Semi-Annually	Date of Next Scheduled EDR Contact: 11/14/05

SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: Region Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
Any contaminated site that impacts groundwater or has the potential to impact groundwater.

Date of Government Version: 11/17/04	Date of Last EDR Contact: 07/25/05
Database Release Frequency: Varies	Date of Next Scheduled EDR Contact: 10/24/05

SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291
Unregulated sites that impact groundwater or have the potential to impact groundwater.

Date of Government Version: 04/01/05	Date of Last EDR Contact: 07/08/05
Database Release Frequency: Semi-Annually	Date of Next Scheduled EDR Contact: 10/03/05

SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: Regional Water Quality Control Board, Victorville Branch
Telephone: 619-241-6583

Date of Government Version: 05/24/05	Date of Last EDR Contact: 07/05/05
Database Release Frequency: Semi-Annually	Date of Next Scheduled EDR Contact: 10/03/05

SLIC REG 6L: SLIC Sites
Source: California Regional Water Quality Control Board, Lahontan Region
Telephone: 530-542-5574

Date of Government Version: 09/07/04	Date of Last EDR Contact: 06/05/05
Database Release Frequency: No Update Planned	Date of Next Scheduled EDR Contact: 09/05/05

SLIC REG 7: SLIC List
Source: California Regional Quality Control Board, Colorado River Basin Region
Telephone: 760-346-7491

Date of Government Version: 11/24/04	Date of Last EDR Contact: 08/22/05
Database Release Frequency: No Update Planned	Date of Next Scheduled EDR Contact: 11/21/05

SLIC REG 8: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: California Region Water Quality Control Board Santa Ana Region (8)
Telephone: 951-782-3298

Date of Government Version: 07/01/04	Date of Last EDR Contact: 07/05/05
Database Release Frequency: Semi-Annually	Date of Next Scheduled EDR Contact: 10/03/05

SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980

Date of Government Version: 06/27/05	Date of Last EDR Contact: 05/31/05
Database Release Frequency: Annually	Date of Next Scheduled EDR Contact: 08/29/05

HAZNET: Facility and Manifest Data
Source: California Environmental Protection Agency
Telephone: 916-255-1136

Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method.

Date of Government Version: 12/31/02
Date of Last EDR Contact: 08/23/05
Database Release Frequency: Annually
Date of Next Scheduled EDR Contact: 11/07/05

LOCAL RECORDS

ALAMEDA COUNTY:

Underground Tanks
Source: Alameda County Environmental Health Services
Telephone: 510-567-6700

Date of Government Version: 06/28/05
Date of Last EDR Contact: 06/28/05
Database Release Frequency: Semi-Annually
Date of Next Scheduled EDR Contact: 10/24/05

Contaminated Sites
Source: Alameda County Environmental Health Services
Telephone: 510-567-6700

A listing of contaminated sites overseen by the Toxic Release Program (oil and groundwater contamination from chemical releases and spills) and the Leaking Underground Storage Tank Program (soil and ground water contamination from leaking petroleum USTs).

Date of Government Version: 08/16/05
Date of Last EDR Contact: 07/25/05
Database Release Frequency: Semi-Annually
Date of Next Scheduled EDR Contact: 10/24/05

CONTRA COSTA COUNTY:

Site List
Source: Contra Costa Health Services Department
Telephone: 925-646-2286

List includes sites from the underground tank, hazardous waste generator and business plan/2185 programs.

Date of Government Version: 06/13/05
Date of Last EDR Contact: 06/13/05
Database Release Frequency: Semi-Annually
Date of Next Scheduled EDR Contact: 08/29/05

FRESNO COUNTY:

CUPA Resources List
Source: Dept. of Community Health
Telephone: 559-445-3271

Certified Unified Program Agency. CUPA's are responsible for implementing a unified hazardous materials and hazardous waste management regulatory program. The agency provides oversight of businesses that deal with hazardous materials, operate underground storage tanks or aboveground storage tanks.

Date of Government Version: 07/22/05
Date of Last EDR Contact: 07/25/05
Database Release Frequency: Semi-Annually
Date of Next Scheduled EDR Contact: 11/07/05

KERN COUNTY:

Underground Storage Tank Sites & Tank Listing
Source: Kern County Environment Health Services Department
Telephone: 661-862-8700
Kern County Sites and Tanks Listing.

Date of Government Version: 05/10/05	Date of Last EDR Contact: 05/02/05
Database Release Frequency: Quarterly	Date of Next Scheduled EDR Contact: 09/05/05

LOS ANGELES COUNTY:

List of Solid Waste Facilities
Source: La County Department of Public Works
Telephone: 818-458-5185

Date of Government Version: 02/01/05	Date of Last EDR Contact: 08/18/05
Database Release Frequency: Varies	Date of Next Scheduled EDR Contact: 11/14/05

City of El Segundo Underground Storage Tank
Source: City of El Segundo Fire Department
Telephone: 310-524-2236

Date of Government Version: 05/31/05	Date of Last EDR Contact: 08/15/05
Database Release Frequency: Semi-Annually	Date of Next Scheduled EDR Contact: 11/14/05

City of Long Beach Underground Storage Tank
Source: City of Long Beach Fire Department
Telephone: 562-570-2563

Date of Government Version: 03/28/03	Date of Last EDR Contact: 08/22/05
Database Release Frequency: Annually	Date of Next Scheduled EDR Contact: 11/21/05

City of Torrance Underground Storage Tank
Source: City of Torrance Fire Department
Telephone: 310-618-2973

Date of Government Version: 06/02/05	Date of Last EDR Contact: 08/15/05
Database Release Frequency: Semi-Annually	Date of Next Scheduled EDR Contact: 11/14/05

City of Los Angeles Landfills
Source: Engineering & Construction Division
Telephone: 213-473-7869

Date of Government Version: 03/01/05	Date of Last EDR Contact: 06/13/05
Database Release Frequency: Varies	Date of Next Scheduled EDR Contact: 09/12/05

HMS: Street Number List
Source: Department of Public Works
Telephone: 626-458-3517
Industrial Waste and Underground Storage Tank Sites.

Date of Government Version: 04/28/05	Date of Last EDR Contact: 08/15/05
Database Release Frequency: Semi-Annually	Date of Next Scheduled EDR Contact: 11/14/05

Site Mitigation List
Source: Community Health Services
Telephone: 323-890-7806
Industrial sites that have had some sort of spill or complaint.

Date of Government Version: 05/25/05
Database Release Frequency: Annually
Date of Last EDR Contact: 08/15/05
Date of Next Scheduled EDR Contact: 11/14/05

San Gabriel Valley Areas of Concern
Source: EPA Region 9
Telephone: 415-972-3178
San Gabriel Valley areas where VOC contamination is at or above the MCL as designated by region 9 EPA office.

Date of Government Version: 12/31/98
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 07/06/99
Date of Next Scheduled EDR Contact: N/A

MARIN COUNTY:

Underground Storage Tank Sites
Source: Public Works Department Waste Management
Telephone: 415-499-6647
Currently permitted USTs in Marin County.

Date of Government Version: 06/28/05
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 08/01/05
Date of Next Scheduled EDR Contact: 10/31/05

NAPA COUNTY:

Sites With Reported Contamination
Source: Napa County Department of Environmental Management
Telephone: 707-253-4269

Date of Government Version: 06/27/05
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 06/27/05
Date of Next Scheduled EDR Contact: 09/26/05

Closed and Operating Underground Storage Tank Sites
Source: Napa County Department of Environmental Management
Telephone: 707-253-4269

Date of Government Version: 06/27/05
Database Release Frequency: Annually
Date of Last EDR Contact: 06/27/05
Date of Next Scheduled EDR Contact: 09/26/05

ORANGE COUNTY:

List of Underground Storage Tank Cleanups
Source: Health Care Agency
Telephone: 714-834-3446
Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 06/01/05
Database Release Frequency: Quarterly
Date of Last EDR Contact: 06/10/05
Date of Next Scheduled EDR Contact: 09/05/05

List of Underground Storage Tank Facilities
Source: Health Care Agency
Telephone: 714-834-3446
Orange County Underground Storage Tank Facilities (UST).

Date of Government Version: 06/01/05
Database Release Frequency: Quarterly
Date of Last EDR Contact: 06/10/05
Date of Next Scheduled EDR Contact: 09/05/05

List of Industrial Site Cleanups
Source: Health Care Agency
Telephone: 714-834-3446
Petroleum and non-petroleum spills.

Date of Government Version: 06/01/05	Date of Last EDR Contact: 06/10/05
Database Release Frequency: Annually	Date of Next Scheduled EDR Contact: 09/05/05

PLACER COUNTY:

Master List of Facilities

Source: Placer County Health and Human Services
Telephone: 530-889-7312
List includes aboveground tanks, underground tanks and cleanup sites.

Date of Government Version: 04/05/05	Date of Last EDR Contact: 06/20/05
Database Release Frequency: Semi-Annually	Date of Next Scheduled EDR Contact: 09/19/05

RIVERSIDE COUNTY:

Listing of Underground Tank Cleanup Sites

Source: Department of Public Health
Telephone: 951-358-5055
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/24/05	Date of Last EDR Contact: 07/18/05
Database Release Frequency: Quarterly	Date of Next Scheduled EDR Contact: 10/17/05

Underground Storage Tank Tank List

Source: Health Services Agency
Telephone: 951-358-5055

Date of Government Version: 05/24/05	Date of Last EDR Contact: 07/18/05
Database Release Frequency: Quarterly	Date of Next Scheduled EDR Contact: 10/17/05

SACRAMENTO COUNTY:

CS - Contaminated Sites

Source: Sacramento County Environmental Management
Telephone: 916-875-8406

Date of Government Version: 04/06/05	Date of Last EDR Contact: 08/26/05
Database Release Frequency: Quarterly	Date of Next Scheduled EDR Contact: 10/31/05

ML - Regulatory Compliance Master List

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Any business that has hazardous materials on site - hazardous material storage sites, underground storage tanks, waste generators.

Date of Government Version: 03/29/05	Date of Last EDR Contact: 08/05/05
Database Release Frequency: Quarterly	Date of Next Scheduled EDR Contact: 10/31/05

SAN BERNARDINO COUNTY:

Hazardous Material Permits

Source: San Bernardino County Fire Department Hazardous Materials Division
Telephone: 909-387-3041
This listing includes underground storage tanks, medical waste handlers/generators, hazardous materials handlers, hazardous waste generators, and waste oil generators/handlers.

Date of Government Version: 06/30/05	Date of Last EDR Contact: 06/05/05
Database Release Frequency: Quarterly	Date of Next Scheduled EDR Contact: 09/05/05

SAN DIEGO COUNTY:

Solid Waste Facilities
Source: Department of Health Services
Telephone: 619-338-2209
San Diego County Solid Waste Facilities.

Date of Government Version: 08/01/00	Date of Last EDR Contact: 08/22/05
Database Release Frequency: Varies	Date of Next Scheduled EDR Contact: 11/21/05

Hazardous Materials Management Division Database
Source: Hazardous Materials Management Division
Telephone: 619-338-2268
The database includes: HE58 - This report contains the business name, site address, business phone number, establishment 'H' permit number, type of permit, and the business status. HE17 - In addition to providing the same information provided in the HE58 listing, HE17 provides inspection dates, violations received by the establishment, hazardous waste generated, the quantity, method of storage, treatment/disposal of waste and the hauler, and information on underground storage tanks. Unauthorized Release List - Includes a summary of environmental contamination cases in San Diego County (underground tank cases, non-tank cases, groundwater contamination, and soil contamination are included.)

Date of Government Version: 05/16/05	Date of Last EDR Contact: 07/08/05
Database Release Frequency: Quarterly	Date of Next Scheduled EDR Contact: 10/03/05

SAN FRANCISCO COUNTY:

Local Oversite Facilities
Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920

Date of Government Version: 06/07/05	Date of Last EDR Contact: 06/05/05
Database Release Frequency: Quarterly	Date of Next Scheduled EDR Contact: 09/05/05

Underground Storage Tank Information
Source: Department of Public Health
Telephone: 415-252-3920

Date of Government Version: 06/07/05	Date of Last EDR Contact: 06/05/05
Database Release Frequency: Quarterly	Date of Next Scheduled EDR Contact: 09/05/05

SAN MATEO COUNTY:

Fuel Leak List
Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921

Date of Government Version: 05/05/05	Date of Last EDR Contact: 07/11/05
Database Release Frequency: Semi-Annually	Date of Next Scheduled EDR Contact: 10/10/05

Business Inventory
Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
List includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

Date of Government Version: 05/12/05
Database Release Frequency: Annually

Date of Last EDR Contact: 07/11/05
Date of Next Scheduled EDR Contact: 10/10/05

SANTA CLARA COUNTY:

Fuel Leak Site Activity Report
Source: Santa Clara Valley Water District
Telephone: 408-265-2600

Date of Government Version: 03/29/05
Database Release Frequency: Semi-Annually

Date of Last EDR Contact: 06/29/05
Date of Next Scheduled EDR Contact: 09/26/05

Hazardous Material Facilities
Source: City of San Jose Fire Department
Telephone: 408-277-4659

Date of Government Version: 07/06/05
Database Release Frequency: Annually

Date of Last EDR Contact: 06/05/05
Date of Next Scheduled EDR Contact: 09/05/05

SOLANO COUNTY:

Leaking Underground Storage Tanks
Source: Solano County Department of Environmental Management
Telephone: 707-784-6770

Date of Government Version: 06/28/05
Database Release Frequency: Quarterly

Date of Last EDR Contact: 06/27/05
Date of Next Scheduled EDR Contact: 09/12/05

Underground Storage Tanks
Source: Solano County Department of Environmental Management
Telephone: 707-784-6770

Date of Government Version: 06/28/05
Database Release Frequency: Quarterly

Date of Last EDR Contact: 06/27/05
Date of Next Scheduled EDR Contact: 09/12/05

SONOMA COUNTY:

Leaking Underground Storage Tank Sites
Source: Department of Health Services
Telephone: 707-565-6565

Date of Government Version: 07/01/05
Database Release Frequency: Quarterly

Date of Last EDR Contact: 07/25/05
Date of Next Scheduled EDR Contact: 10/24/05

SUTTER COUNTY:

Underground Storage Tanks
Source: Sutter County Department of Agriculture
Telephone: 530-822-7500

Date of Government Version: 01/29/04
Database Release Frequency: Semi-Annually

Date of Last EDR Contact: 07/18/05
Date of Next Scheduled EDR Contact: 10/03/05

VENTURA COUNTY:

Inventory of Illegal Abandoned and Inactive Sites
Source: Environmental Health Division
Telephone: 805-654-2813
Ventura County Inventory of Closed, Illegal Abandoned, and Inactive Sites.

Date of Government Version: 08/01/04	Date of Last EDR Contact: 05/23/05
Database Release Frequency: Annually	Date of Next Scheduled EDR Contact: 08/22/05

Listing of Underground Tank Cleanup Sites
Source: Environmental Health Division
Telephone: 805-654-2813
Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 06/01/05	Date of Last EDR Contact: 06/17/05
Database Release Frequency: Quarterly	Date of Next Scheduled EDR Contact: 09/12/05

Underground Tank Closed Sites List
Source: Environmental Health Division
Telephone: 805-654-2813
Ventura County Operating Underground Storage Tank Sites (UST)/Underground Tank Closed Sites List.

Date of Government Version: 07/05/05	Date of Last EDR Contact: 07/15/05
Database Release Frequency: Quarterly	Date of Next Scheduled EDR Contact: 10/10/05

Business Plan, Hazardous Waste Producers, and Operating Underground Tanks
Source: Ventura County Environmental Health Division
Telephone: 805-654-2813
The BWT list indicates by site address whether the Environmental Health Division has Business Plan (B), Waste Producer (W), and/or Underground Tank (T) information.

Date of Government Version: 06/01/05	Date of Last EDR Contact: 06/17/05
Database Release Frequency: Quarterly	Date of Next Scheduled EDR Contact: 09/12/05

YOLO COUNTY:

Underground Storage Tank Comprehensive Facility Report
Source: Yolo County Department of Health
Telephone: 530-666-8646

Date of Government Version: 07/19/05	Date of Last EDR Contact: 07/18/05
Database Release Frequency: Annually	Date of Next Scheduled EDR Contact: 10/17/05

EDR PROPRIETARY HISTORICAL DATABASES

Former Manufactured Gas (Coal Gas) Sites: The existence and location of Coal Gas sites is provided exclusively to EDR by Real Property Scan, Inc. ©Copyright 1993 Real Property Scan, Inc. For a technical description of the types of hazards which may be found at such sites, contact your EDR customer service representative.

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BROWNFIELDS DATABASES

VCP: Voluntary Cleanup Program Properties
Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

Date of Government Version: 05/04/05
Database Release Frequency: Quarterly
Date of Last EDR Contact: 06/01/05
Date of Next Scheduled EDR Contact: 08/29/05

US BROWNFIELDS: A Listing of Brownfields Sites
Source: Environmental Protection Agency
Telephone: 202-566-2777
Included in the listing are brownfields properties addresses by Cooperative Agreement Recipients and brownfields properties addressed by Targeted Brownfields Assessments. Targeted Brownfields Assessments-EPA's Targeted Brownfields Assessments (TBA) program is designed to help states, tribes, and municipalities--especially those without EPA Brownfields Assessment Demonstration Pilots--minimize the uncertainties of contamination often associated with brownfields. Under the TBA program, EPA provides funding and/or technical assistance for environmental assessments at brownfields sites throughout the country. Targeted Brownfields Assessments supplement and work with other efforts under EPA's Brownfields Initiative to promote cleanup and redevelopment of brownfields. Cooperative Agreement Recipients-States, political subdivisions, territories, and Indian tribes become Brownfields Cleanup Revolving Loan Fund (BCRLF) cooperative agreement recipients when they enter into BCRLF cooperative agreements with the U.S. EPA. EPA selects BCRLF cooperative agreement recipients based on a proposal and application process. BCRLF cooperative agreement recipients must use EPA funds provided through BCRLF cooperative agreement for specified brownfields-related cleanup activities.

Date of Government Version: 01/10/05
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 06/13/05
Date of Next Scheduled EDR Contact: 09/12/05

US INST CONTROL: Sites with Institutional Controls
Source: Environmental Protection Agency
Telephone: 703-603-8867
A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 01/10/05
Database Release Frequency: Varies
Date of Last EDR Contact: 07/05/05
Date of Next Scheduled EDR Contact: 10/03/05

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

Oil/Gas Pipelines: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

Electric Power Transmission Line Data
Source: PennWell Corporation
Telephone: (800) 823-6277
This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Licensed Facilities
Source: Department of Social Services
Telephone: 916-657-4041

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 from the U.S. Fish and Wildlife Service.

STREET AND ADDRESS INFORMATION

GEOCHECK®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

BRIDGEHEAD ROAD AND MAIN STREET
BRIDGEHEAD ROAD/MAIN STREET
OAKLEY, CA 94561

TARGET PROPERTY COORDINATES

Latitude (North):	38.006302 - 38˚ 0' 22.7"
Longitude (West):	121.747200 - 121˚ 44' 49.9"
Universal Tranverse Mercator:	Zone 10
UTM X (Meters):	609988.0
UTM Y (Meters):	4207049.0
Elevation:	22 ft. above sea level

EDR's GeoCheck Physical Setting Source Addendum has been developed to assist the environmental professional with the collection of physical setting source information in accordance with ASTM 1527-00, Section 7.2.3. Section 7.2.3 requires that a current USGS 7.5 Minute Topographic Map (or equivalent, such as the USGS Digital Elevation Model) be reviewed. It also requires that one or more additional physical setting sources be sought when (1) conditions have been identified in which hazardous substances or petroleum products are likely to migrate to or from the property, and (2) more information than is provided in the current USGS 7.5 Minute Topographic Map (or equivalent) is generally obtained, pursuant to local good commercial or customary practice, to assess the impact of migration of recognized environmental conditions in connection with the property. Such additional physical setting sources generally include information about the topographic, hydrologic, hydrogeologic, and geologic characteristics of a site, and wells in the area.

Assessment of the impact of contaminant migration generally has two principle investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata. EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

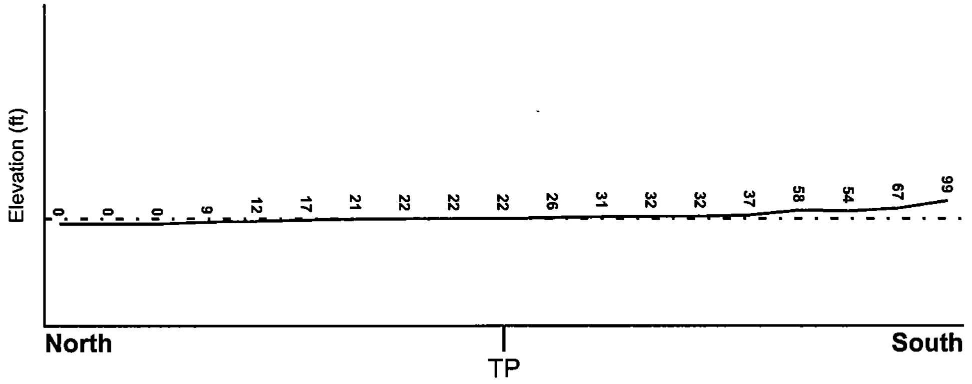
TOPOGRAPHIC INFORMATION

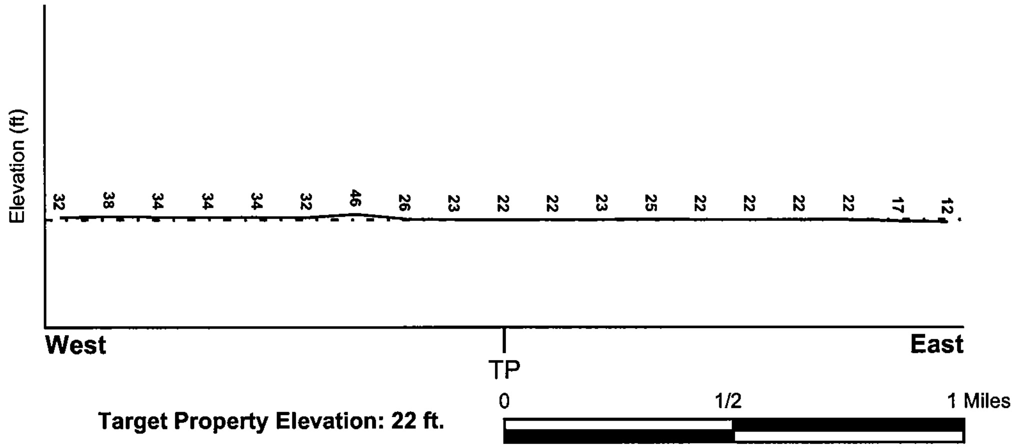
Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

USGS Topographic Map:	38121-A6 JERSEY ISLAND, CA
General Topographic Gradient:	General NNE
Source:	USGS 7.5 min quad index

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES





Target Property Elevation: 22 ft.

Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Target Property County	FEMA Flood Electronic Data
CONTRA COSTA, CA	YES - refer to the Overview Map and Detail Map

Flood Plain Panel at Target Property:	0600250175B
Additional Panels in search area:	0600250145B 0600260003C 0600250355B 0600250335B

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
JERSEY ISLAND	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Site-Specific Hydrogeological Data*:

Search Radius:	1.25 miles
Status:	Not found

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

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* ©1996 Site-specific hydrogeological data gathered by CERCLIS Alerts, Inc., Bainbridge Island, WA. All rights reserved. All of the information and opinions presented are those of the cited EPA report(s), which were completed under a Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) investigation.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

Era:	Cenozoic
System:	Quaternary
Series:	Quaternary
Code:	Q *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Stratifed Sequence

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps. The following information is based on Soil Conservation Service STATSGO data.

Soil Component Name:	VERITAS
Soil Surface Texture:	fine sandy loam
Hydrologic Group:	Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.
Soil Drainage Class:	Moderately well drained. Soils have a layer of low hydraulic conductivity, wet state high in the profile. Depth to water table is 3 to 6 feet.

Hydric Status: Soil does not meet the requirements for a hydric soil.

Corrosion Potential - Uncoated Steel:	HIGH
Depth to Bedrock Min:	> 60 inches
Depth to Bedrock Max:	> 60 inches

Soil Layer Information							
	Boundary			Classification			
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil	Permeability Rate (in/hr)	Soil Reaction (pH)
1	0 inches	15 inches	fine sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 6.00 Min: 2.00	Max: 8.40 Min: 7.40
2	15 inches	54 inches	sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 6.00 Min: 2.00	Max: 8.40 Min: 7.40
3	54 inches	70 inches	cemented	Not reported	Not reported	Max: 0.00 Min: 0.00	Max: 0.00 Min: 0.00

OTHER SOIL TYPES IN AREA

Based on Soil Conservation Service STATSGO data, the following additional subordinant soil types may appear within the general area of target property.

Soil Surface Textures:	loamy sand loamy coarse sand sandy loam fine sand coarse sandy loam
Surficial Soil Types:	loamy sand loamy coarse sand sandy loam fine sand coarse sandy loam
Shallow Soil Types:	fine sandy loam indurated sandy clay loam
Deeper Soil Types:	sand loamy coarse sand loam stratified

ADDITIONAL ENVIRONMENTAL RECORD SOURCES

According to ASTM E 1527-00, Section 7.2.2, "one or more additional state or local sources of environmental records may be checked, in the discretion of the environmental professional, to enhance and supplement federal and state sources... Factors to consider in determining which local or additional state records, if any, should be checked include (1) whether they are reasonably ascertainable, (2) whether they are sufficiently useful, accurate, and complete in light of the objective of the records review (see 7.1.1), and (3) whether they are obtained, pursuant to local, good commercial or customary practice." One of the record sources listed in Section 7.2.2 is water well information. Water well information can be used to assist the environmental professional in assessing sources that may impact groundwater flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
1	USGS3227874	0 - 1/8 Mile ESE
2	USGS3227867	1/8 - 1/4 Mile ESE
5	USGS3227864	1/2 - 1 Mile West

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
3	1683	1/4 - 1/2 Mile West
4	1682	1/2 - 1 Mile WNW

STATE OIL/GAS WELL INFORMATION

DISTANCE FROM TP (Miles)	DISTANCE FROM TP (Miles)
1/2 - 1 Mile NE	1/2 - 1 Mile East
1/2 - 1 Mile SSW	1/2 - 1 Mile South

PHYSICAL SETTING SOURCE MAP - 1502948.2s

0 1/4 1/2 1 Miles

- County Boundary
- Major Roads
- Contour Lines
- Earthquake Fault Lines
- ◎ Earthquake epicenter, Richter 5 or greater
- Ⓦ Water Wells
- Ⓟ Public Water Supply Wells
- ● Cluster of Multiple Icons

- ↑ Groundwater Flow Direction
- (GI) Indeterminate Groundwater Flow at Location
- (GV) Groundwater Flow Varies at Location
- (HD) Closest Hydrogeological Data
- ● Oil, gas or related wells

TARGET PROPERTY:	Bridgehead Road and Main Street	CUSTOMER:	Kleinfelder, Inc.
ADDRESS:	Bridgehead Road/Main Street	CONTACT:	Ryan Brosius
CITY/STATE/ZIP:	Oakley CA 94561	INQUIRY #:	1502948.2s
LAT/LONG:	38.0063 / 121.7472	DATE:	September 02, 2005 6:15 pm

Map ID Direction Distance Elevation	Database	EDR ID Number
1 **ESE** **0 - 1/8 Mile** **Higher**	**FED USGS**	**USGS3227874**

Agency cd:	USGS	Site no:	380020121443901
Site name:	002N002E22F001M		
Latitude:	380020		
Longitude:	1214439	Dec lat:	38.00547706
Dec lon:	-121.74523183	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	013
Country:	US	Land net:	SWSENWS22 T02N R02E M
Location map:	JERSEY ISLAND	Map scale:	24000
Altitude:	27.00	Altitude method:	M
Altitude accuracy:	10	Altitude datum:	NGVD29
Hydrologic:	Upper ChowchillaUpper Fresno. California. Area = 938 sq.mi.		
Topographic:	Flat surface		
Site type:	Ground-water other than Spring	Date construction:	19540101
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	ALLUVIUM (QUATERNARY)		
Well depth:	66.0	Hole depth:	66.0
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	1973-01-25
Water quality data end date:	1982-09-24	Water quality data count:	22
Ground water data begin date:	1973-01-25	Ground water data end date:	1982-09-24
Ground water data count:	22		

Ground-water levels, Number of Measurements: 22

Date	Feet below Surface	Feet to Sealevel	Date	Feet below Surface	Feet to Sealevel
1982-09-24	13.38		1982-04-28	12.50	
1981-09-17	14.98		1981-04-21	14.50	
1980-09-24	13.80		1980-04-10	13.02	
1979-09-24	14.93		1979-04-17	14.00	
1978-09-25	14.62		1978-04-17	13.66	
1977-09-13	16.57		1977-04-26	16.08	
1976-09-15	15.90		1976-04-12	15.80	
1975-09-16	15.38		1975-04-07	14.68	
1974-09-24	14.82		1974-03-11	14.05	
1973-10-04	13.89		1973-03-21	12.24	
1973-02-20	13.02		1973-01-25	14.03	

2 **ESE** **1/8 - 1/4 Mile** **Higher**	**FED USGS**	**USGS3227867**

Agency cd:	USGS	Site no:	380017121443201
Site name:	002N002E22L001M		
Latitude:	380017		
Longitude:	1214432	Dec lat:	38.00464376
Dec lon:	-121.74328736	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	013
Country:	US	Land net:	NENESWS22 T02N R02E M
Location map:	JERSEY ISLAND	Map scale:	24000
Altitude:	32.00	Altitude method:	M
Altitude accuracy:	10	Altitude datum:	NGVD29
Hydrologic:	Upper ChowchillaUpper Fresno. California. Area = 938 sq.mi.		
Topographic:	Flat surface		
Site type:	Ground-water other than Spring	Date construction:	19620601
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	ALLUVIUM (QUATERNARY)		
Well depth:	63.0	Hole depth:	63.0
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	1972-06-22
Water quality data end date:	1981-04-21	Water quality data count:	25
Ground water data begin date:	1962-06-01	Ground water data end date:	1982-09-24
Ground water data count:	9		

Ground-water levels, Number of Measurements: 18

Date	Feet below Surface	Feet to Sealevel
1982-09-24	23.18	
1982-04-28	22.29	
1981-09-17	24.85	
1981-04-21	24.32	
1980-09-26	23.52	
1980-09-24	26.20	
Note: The site was being pumped.		
1980-09-24	26.20	
Note: The site was being pumped.		
1980-04-10	22.8	
1979-10-25	23.7	
1962-06-01	20.00	

Date	Feet below Surface	Feet to Sealevel
1982-09-24	23.18	
1982-04-28	22.29	
1981-09-17	24.85	
1981-04-21	24.32	
1980-09-26	23.52	
1980-04-10	22.8	
1979-10-25	23.7	
1962-06-01	20.00	

3
West
1/4 - 1/2 Mile
Higher

CA WELLS 1683

Water System Information:

Prime Station Code:	02N/02E-21H01 M	User ID:	07C
FRDS Number:	0707548001	County:	Contra Costa
District Number:	37	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	380025.0 1214505.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	WELL 01		

System Number:	0707548		
System Name:	LODGE WATER SYSTEM		
Organization That Operates System:	Not Reported		
Pop Served:	Unknown, Small System	Connections:	Unknown, Small System
Area Served:	Not Reported		

4
WNW
1/2 - 1 Mile
Higher

CA WELLS 1682

Water System Information:

Prime Station Code:	02N/02E-21C01 M	User ID:	07C
FRDS Number:	0707554001	County:	Contra Costa
District Number:	37	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	380036.0 1214540.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	WELL 01		
System Number:	0707554		
System Name:	RIVERVIEW MOTEL		
Organization That Operates System:	Not Reported		
Pop Served:	Unknown, Small System	Connections:	Unknown, Small System
Area Served:	Not Reported		

5
West
1/2 - 1 Mile
Higher

FED USGS USGS3227864

Agency cd:	USGS	Site no:	380016121454501
Site name:	002N002E21L001M		
Latitude:	380016		
Longitude:	1214545	Dec lat:	38.00436596
Dec lon:	-121.76356558	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	013
Country:	US	Land net:	NENWSES21 T02N R02E M
Location map:	ANTIOCH NORTH	Map scale:	24000
Altitude:	50.00	Altitude method:	M
Altitude accuracy:	10	Altitude datum:	NGVD29
Hydrologic:	Upper ChowchillaUpper Fresno. California. Area = 938 sq.mi.		
Topographic:	Hillside (slope)		
Site type:	Ground-water other than Spring	Date construction:	19620101
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	ALLUVIUM (QUATERNARY)		
Well depth:	140	Hole depth:	140
Source of depth data:	Not Reported	Project number:	Not Reported
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00

Peak flow data count: 0
Water quality data end date:1982-09-24
Ground water data begin date: 1962-01-01
Ground water data count: 2

Water quality data begin date: 1972-09-20
Water quality data count: 26
Ground water data end date: 1980-04-10

Ground-water levels, Number of Measurements: 4

Date	Feet below Surface	Feet to Sealevel
1980-04-10	22.8	
1962-01-01	50.00	

Date	Feet below Surface	Feet to Sealevel
1980-04-10	22.8	
1962-01-01	50.00	

Direction
Distance — Database — EDR ID Number

NE
1/2 - 1 Mile — **OIL_GAS** — **CA00004568**

Well Number:	2	Status:	Plugged and abandoned-dry hole-directional
API Number:	01320057	Operator:	Great Yellowstone Corp.
Latitude:	38.01269	Longitude:	-121.74050
Region:	6	Lease:	Du Pont
Section:	15	Township:	02N
Range:	02E	Map Number:	608
Base and Meridian:	Mount Diablo	Total Depth:	6565.00000
Spud Date:	10/17/1969	Abandonment Date:	11/8/1969

East
1/2 - 1 Mile — **OIL_GAS** — **CA00004581**

Well Number:	1	Status:	Plugged and abandoned-dry hole
API Number:	01320048	Operator:	Great Yellowstone Corp.
Latitude:	38.00667	Longitude:	-121.73295
Region:	6	Lease:	Du Pont
Section:	22	Township:	02N
Range:	02E	Map Number:	608
Base and Meridian:	Mount Diablo	Total Depth:	6820.00000
Spud Date:	4/16/1969	Abandonment Date:	5/4/1969

SSW
1/2 - 1 Mile — **OIL_GAS** — **CA00004496**

Well Number:	1	Status:	Plugged and abandoned-dry hole
API Number:	01320142	Operator:	McFarland Energy, Inc.
Latitude:	37.99722	Longitude:	-121.74929
Region:	6	Lease:	Calplans-New Love
Section:	27	Township:	02N
Range:	02E	Map Number:	608
Base and Meridian:	Mount Diablo	Total Depth:	6985.00000
Spud Date:	10/9/1979	Abandonment Date:	10/23/1979

South
1/2 - 1 Mile — **OIL_GAS** — **CA00004675**

Well Number:	1-27	Status:	Plugged and abandoned-dry hole
API Number:	01300277	Operator:	Occidental Petroleum Corp.
Latitude:	37.99589	Longitude:	-121.74553
Region:	6	Lease:	Shell-Continente
Section:	27	Township:	02N
Range:	02E	Map Number:	608
Base and Meridian:	Mount Diablo	Total Depth:	7105.00000
Spud Date:	8/17/1966	Abandonment Date:	8/25/1966

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

State Database: CA Radon

Radon Test Results

Zip	Total Sites	> 4 Pci/L	Pct. > 4 Pci/L
94561	2	0	0.00

Federal EPA Radon Zone for CONTRA COSTA County: 2

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for CONTRA COSTA COUNTY, CA

Number of sites tested: 55

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.760 pCi/L	100%	0%	0%
Living Area - 2nd Floor	0.300 pCi/L	100%	0%	0%
Basement	0.525 pCi/L	100%	0%	0%

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002. 7.5-Minute DEMs correspond to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps.

HYDROLOGIC INFORMATION

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 from the U.S. Fish and Wildlife Service.

HYDROGEOLOGIC INFORMATION

AQUIFLOW^R Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

ADDITIONAL ENVIRONMENTAL RECORD SOURCES

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

STATE RECORDS

California Drinking Water Quality Database
Source: Department of Health Services
Telephone: 916-324-2319
The database includes all drinking water compliance and special studies monitoring for the state of California since 1984. It consists of over 3,200,000 individual analyses along with well and water system information.

California Oil and Gas Well Locations for District 2, 3, 5 and 6
Source: Department of Conservation
Telephone: 916-323-1779

RADON

State Database: CA Radon
Source: Department of Health Services
Telephone: 916-324-2208
Radon Database for California

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

California Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary fault lines, prepared in 1975 by the United State Geological Survey. Additional information (also from 1975) regarding activity at specific fault lines comes from California's Preliminary Fault Activity Map prepared by the California Division of Mines and Geology.

Office of the State Fire Marshal
Pipeline Safety Division
P.O. Box 944246
Sacramento, CA 94244-2460

Request ID: 09012005SFM012

TO: KLEINFELDER, INC
RACHEL DESLER
2825 E. MYRTLE STREET
STOCKTON, CA 95205

Phone: 209 948 1345
Fax: 209 948 0621

FROM: Lisa Dowdy
Phone: (916) 445-8477
Fax: (916) 445-8526

PIPELINE LOCATION REQUEST FOR:

PAVILLION PARKWAY
TRACY, CA 95206
SAN JOAQUIN Thomas Brothers Book
Page 422, Grid D4

THERE ARE NO PIPELINES JURISDICTIONAL TO THE STATE FIRE MARSHAL IN THE AREA FOR WHICH YOU HAVE INQUIRED.

- FOR NATURAL GAS PIPELINES PLEASE CONTACT YOUR LOCAL GAS COMPANY

- FOR OTHER TYPES OF PIPELINE PLEASE CONTACT THE DIVISION OF OIL AND GAS AT (714) 816-6847

- FOR PUBLIC UTILITIES PLEASE CONTACT THE PUBLIC UTILITIES COMMISSION AT (415) 703-2782

Lisa Dowdy
Research Analyst I
Office fo the State Fire Marshal

Office of the State Fire Marshal
Pipeline Safety Division
P.O. Box 944246
Sacramento, CA 94244-2460

Request ID: 08232005SFM002

TO: KLEINFELDER, INC
RACHEL DESLER
2825 E. MYRTLE STREET
STOCKTON, CA 95205

Phone: 209 948 1345
Fax: 209 948 0621

FROM: Lisa Dowdy
Phone: (916) 445-8477
Fax: (916) 445-8526

PIPELINE LOCATION REQUEST FOR:

FARMINGTON RD
STOCKTON, CA 95205
SAN JOAQUIN Thomas Brothers Book
Page 365, Grid D6

THERE ARE NO PIPELINES JURISDICTIONAL TO THE STATE FIRE MARSHAL IN THE AREA FOR WHICH YOU HAVE INQUIRED.

- FOR NATURAL GAS PIPELINES PLEASE CONTACT YOUR LOCAL GAS COMPANY

- FOR OTHER TYPES OF PIPELINE PLEASE CONTACT THE DIVISION OF OIL AND GAS AT (714) 816-6847

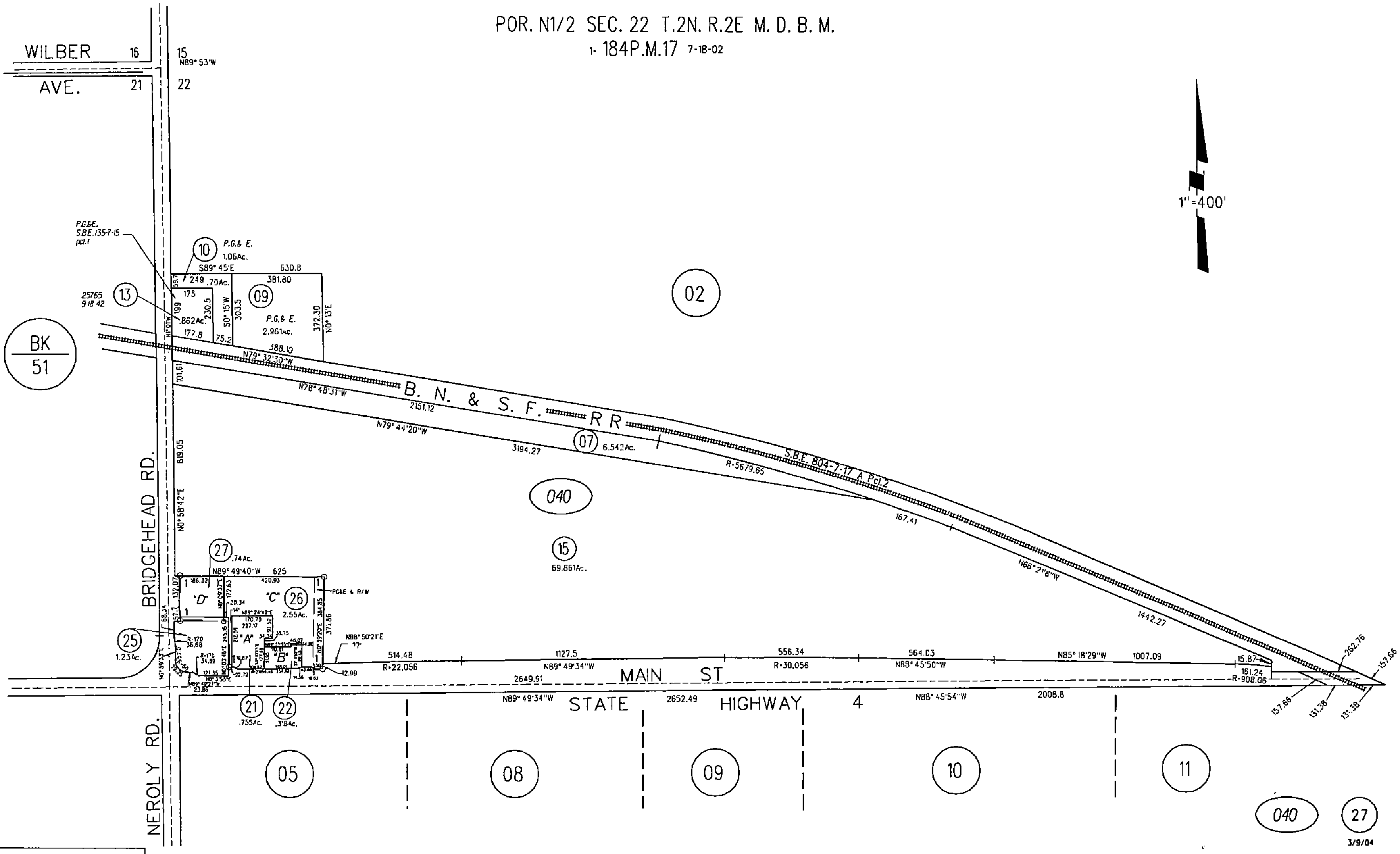
- FOR PUBLIC UTILITIES PLEASE CONTACT THE PUBLIC UTILITIES COMMISSION AT (415) 703-2782

Lisa Dowdy
Research Analyst I
Office fo the State Fire Marshal

APPENDIX C

HISTORICAL RESEARCH DOCUMENTATION

POR. N1/2 SEC. 22 T.2N. R.2E M. D. B. M.
1- 184P.M.17 7-18-02



NOTE: THIS MAP WAS PREPARED FOR ASSESSMENT PURPOSES ONLY. NO LIABILITY IS ASSUMED FOR THE ACCURACY OF THE INFORMATION DELINEATED HEREON. ASSESSOR'S PARCELS MAY NOT COMPLY WITH LOCAL LOT SPLIT OR BUILDING SITE ORDINANCES.

23-7
ASSESSOR'S MAP
BOOK 37 PAGE 04
CONTRA COSTA COUNTY, CALIF.

RECEIVED
SEP 0 8 2005
KLEINFELDER, INC.

EDR® Environmental
Data Resources Inc

The EDR Aerial Photo Decade Package

Bridgehead Road and Main Street
Bridgehead Road/Main Street
Oakley, CA 94561

1502948.6

September 06, 2005

The Standard in Environmental Risk Management Information

440 Wheelers Farms Road
Milford, Connecticut 06460

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edrnet.com

MOR

Environmental Data Resources, Inc.
Aerial Photography Print Service

Environmental Data Resources, Inc.'s (EDR) Aerial Photography Print Service is a screening tool designed to assist professionals in evaluating potential liability on a target property resulting from past activities. ASTM E 1527-00, Section 7.3 on Historical Use Information, identifies the prior use requirements for a Phase I environmental site assessment. The ASTM standard requires a review of *reasonably ascertainable standard historical sources. Reasonably ascertainable means information that is publicly available, obtainable from a source with reasonable time and cost constraints, and practically reviewable.*

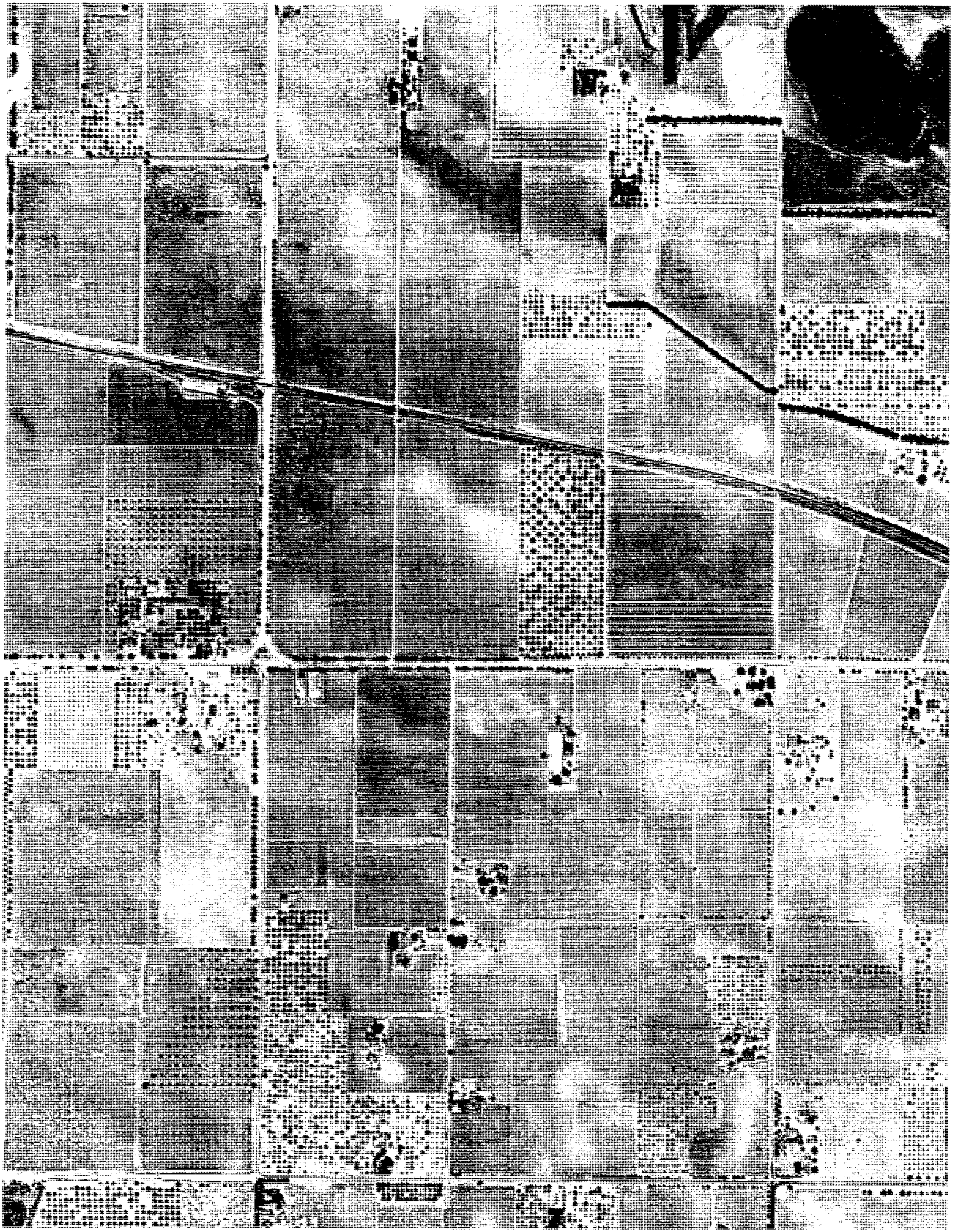
To meet the prior use requirements of ASTM E 1527-00, Section 7.3.4, the following *standard historical sources* may be used: aerial photographs, fire insurance maps, property tax files, land title records (although these cannot be the sole historical source consulted), topographic maps, city directories, building department records, or zoning/land use records. ASTM E 1527-00 requires *"All obvious uses of the property shall be identified from the present, back to the property's obvious first developed use, or back to 1940, whichever is earlier. This task requires reviewing only as many of the standard historical sources as are necessary, and that are reasonably ascertainable and likely to be useful."* (ASTM E 1527-00, Section 7.3.2, page 12.)

Aerial Photographs

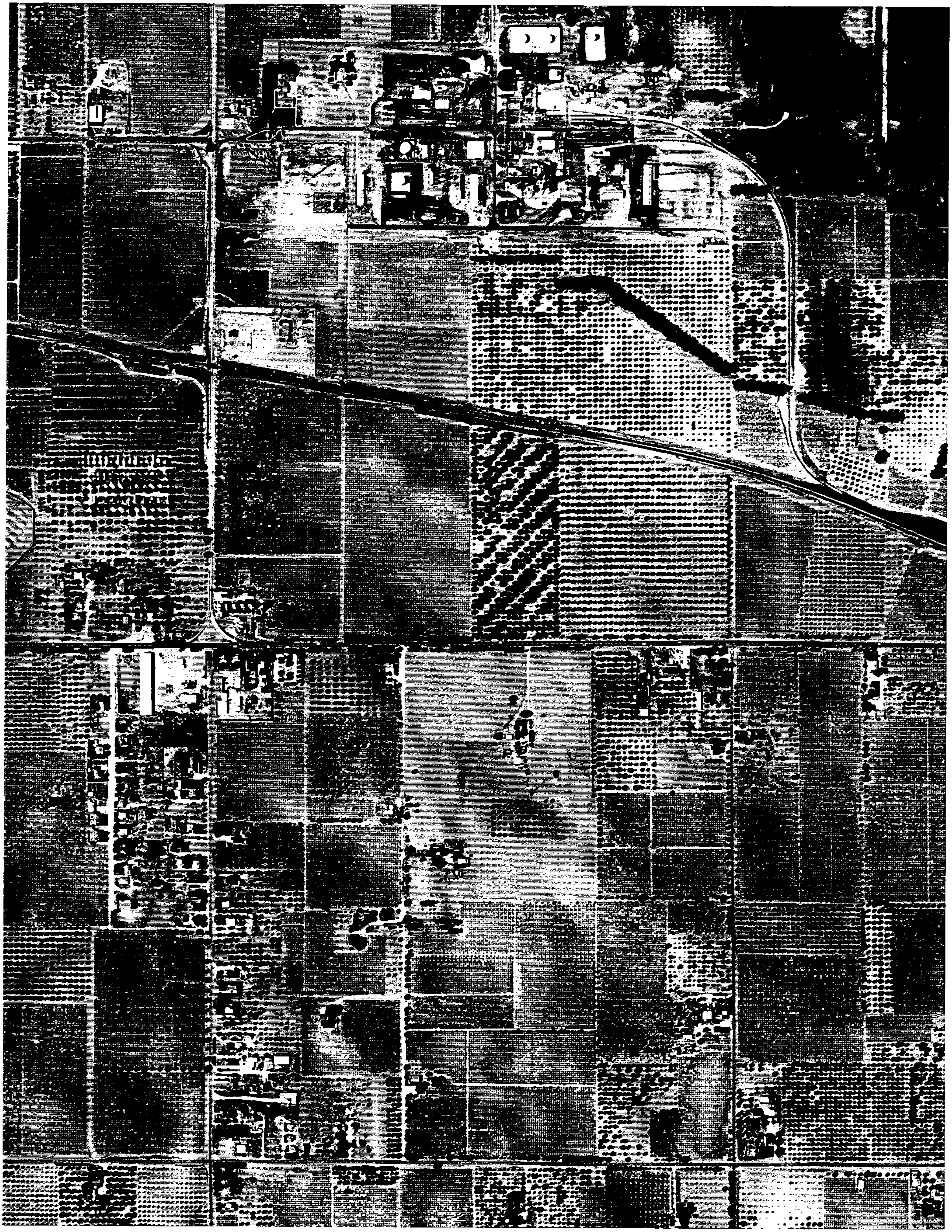
When delivered electronically by EDR, the aerial photo images included with this report are for ONE TIME USE ONLY. Further reproduction of these aerial photo images is prohibited without permission from EDR. For more information contact your EDR Account Executive.

Aerial photographs are a valuable historical resource for documenting past land use and can be particularly helpful when other historical sources (such as city directories or fire insurance maps) are not reasonably ascertainable. The EDR Aerial Photograph Print Service includes a search of local aerial photograph collections flown by public and private agencies. EDR's professional field-based researchers provide digitally reproduced historical aerial photographs at ten year intervals.

Please call Environmental Data Resources, Inc. Nationwide Customer Service at
1-800-352-0050 (8am-8pm ET)
with questions or comments about your report.
Thank you for your business!



Inquiry: **1502948.6** Year: 1939 Flyer: Fairchild Scale: 1″=555′



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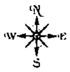

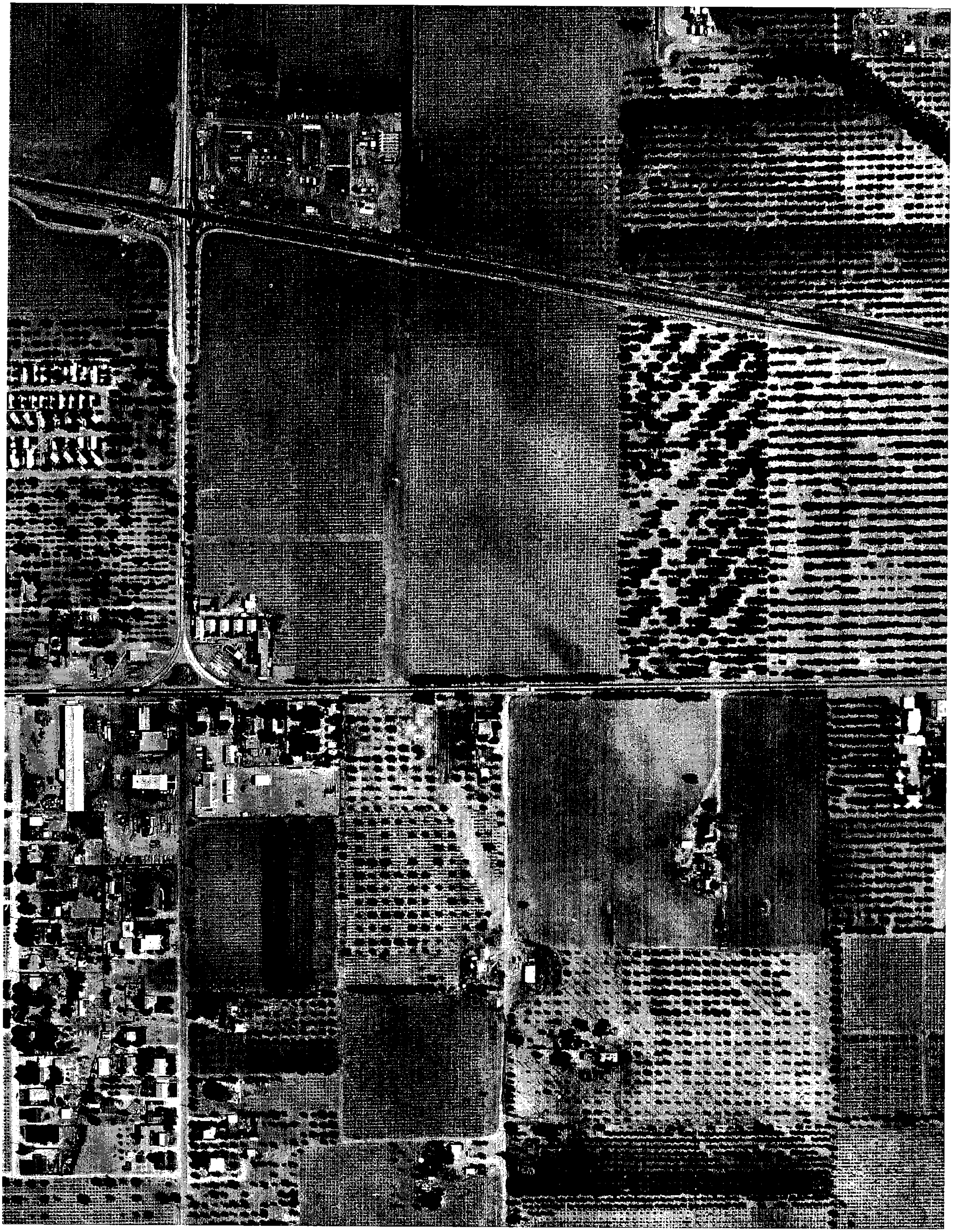

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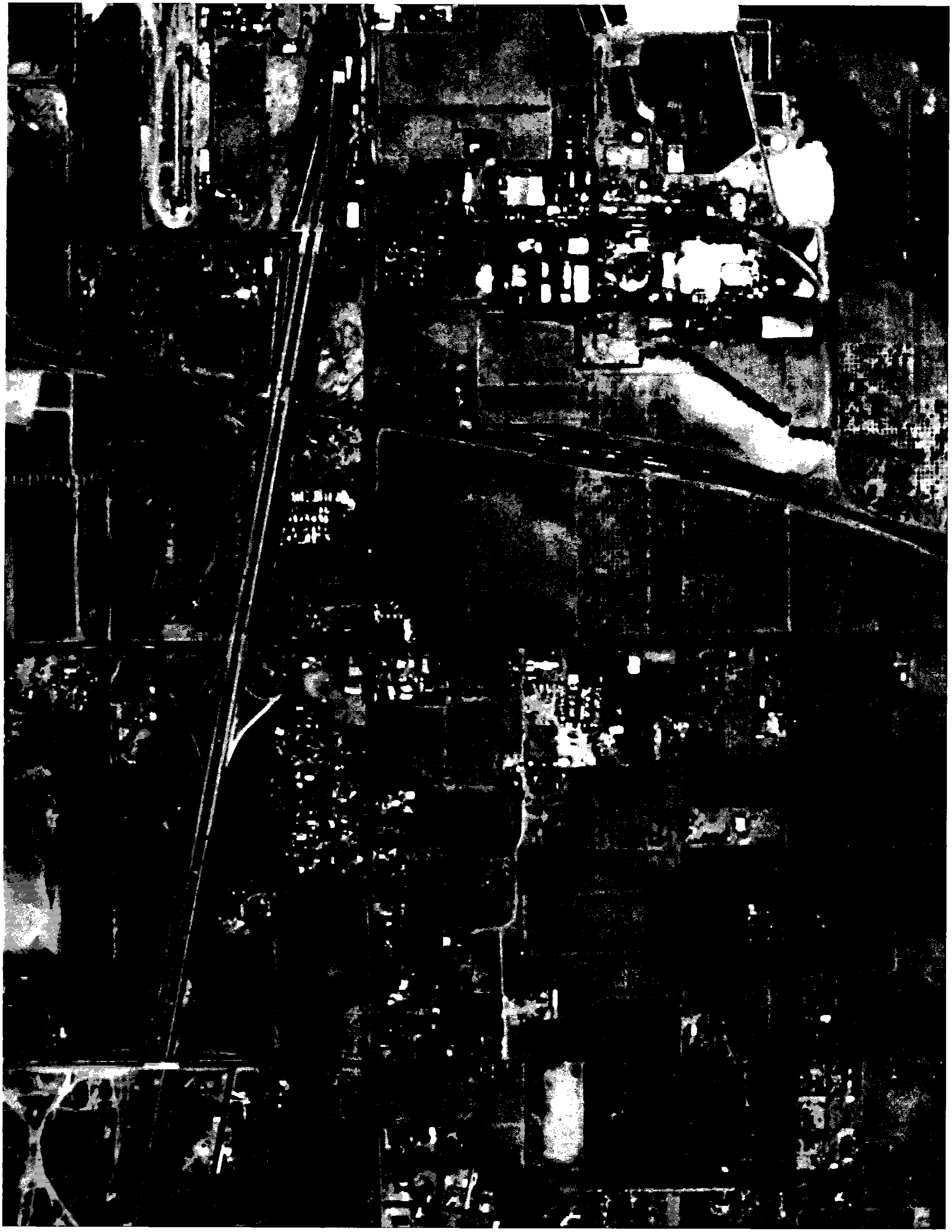
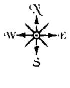
Inquiry: 1502948.6 Year: 1971 Flyer: Cartwright Scale: 1″=333



Inquiry: **1502948.6** Year: 1984 Flyer: WSA Scale: 1″=690′



Inquiry: 1502948.6 Year: 1993 Flyer: USGS Scale: 1″=666′

Inquiry: **1502948.6** Year: 1998 Flyer: USGS Scale: 1"=666'

EDR® Environmental
Data Resources Inc

"Linking Technology with Tradition"®

Sanborn® Map Report

Ship To: Ryan Brosius
Kleinfelder, Inc.
2825 E, Myrtle Street
Stockton, CA 95205

Order Date: 9/2/2005 **Completion Date:** 9/2/2005
Inquiry #: 1502948.3
P.O. #: NA
Site Name: Bridgehead Road and Main Street
Address: Bridgehead Road/Main Street
City/State: Oakley, CA 94561
Cross Streets:

Customer Project: NA
1033791MOR 209-948-1345

This document reports that the largest and most complete collection of Sanborn fire insurance maps has been reviewed based on client supplied information, and fire insurance maps depicting the target property at the specified address were not identified.

NO COVERAGE

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EDR® Environmental
Data Resources Inc

EDR Historical Topographic Map Report

Bridgehead Road and Main Street
Bridgehead Road/Main Street
Oakley, CA 94561

Inquiry Number: 1502948.4

September 06, 2005

The Standard in Environmental Risk Management Information

440 Wheelers Farms Road
Milford, Connecticut 06460

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edrnet.com

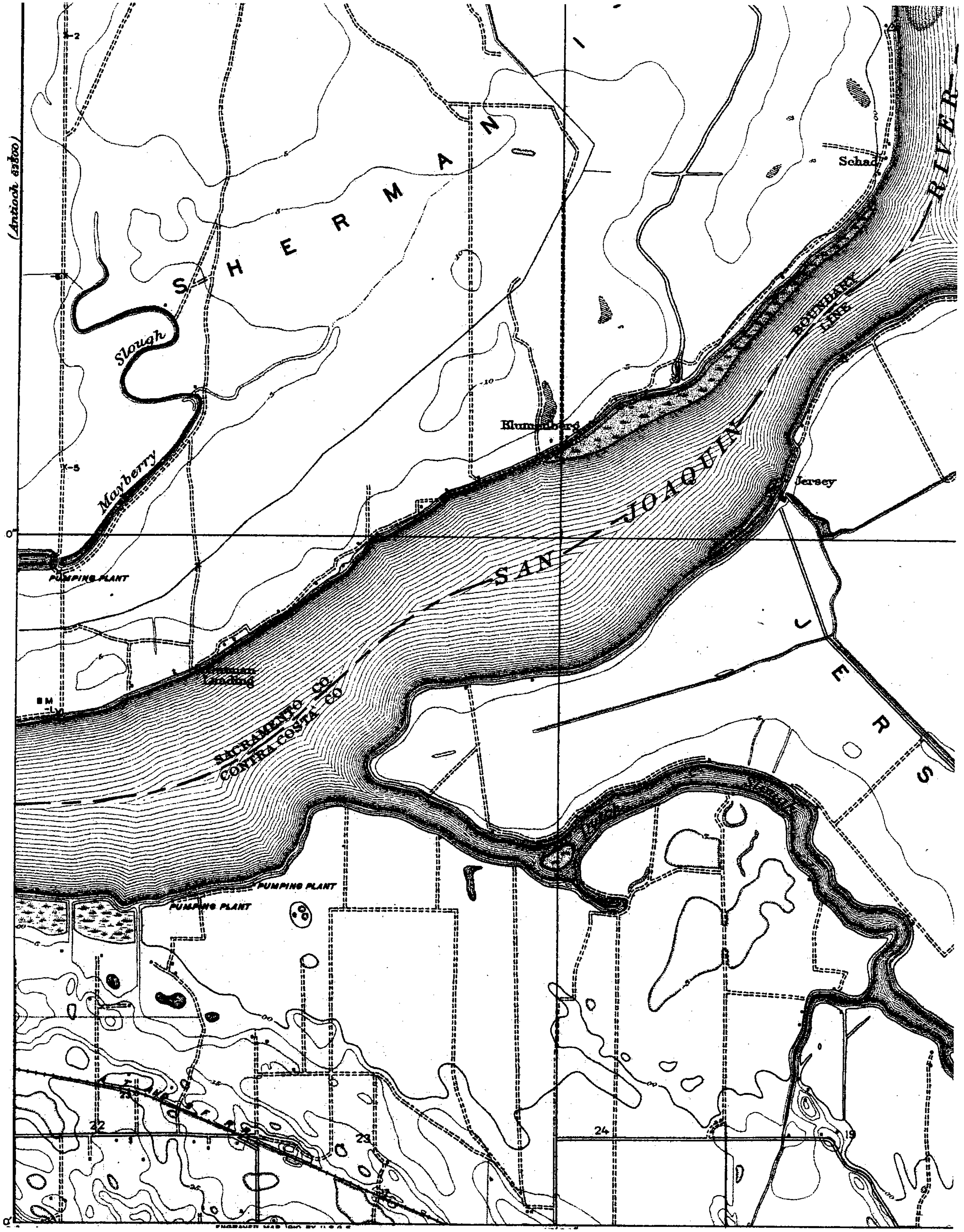
EDR Historical Topographic Map Report

Environmental Data Resources, Inc.'s (EDR) Historical Topographic Map Report is designed to assist professionals in evaluating potential liability on a target property, and its surrounding area, resulting from past activities. ASTM E 1527-00, Section 7.3 on Historical Use Information, identifies the prior use requirements for a Phase I environmental site assessment. The ASTM standard requires a review of *reasonably ascertainable standard historical sources. Reasonably ascertainable is defined as information that is publicly available, obtainable from a source with reasonable time and cost constraints, and practically reviewable.* To meet the prior use requirements of ASTM E 1527-00, Section 7.3.4, the following *standard historical sources* may be used: aerial photographs, city directories, fire insurance maps, topographic maps, property tax files, land title records (although these cannot be the sole historical source consulted), building department records, or zoning/and use records. ASTM E 1527-00 requires *"All obvious uses of the property shall be identified from the present, back to the property's obvious first developed use, or back to 1940, whichever is earlier. This task requires reviewing only as many of the standard historical sources as are necessary, and that are reasonably ascertainable and likely to be useful."* (ASTM E 1527-00, Section 7.3.2 page 12.)

EDR's Historical Topographic Map Report includes a search of available public and private color historical topographic map collections.

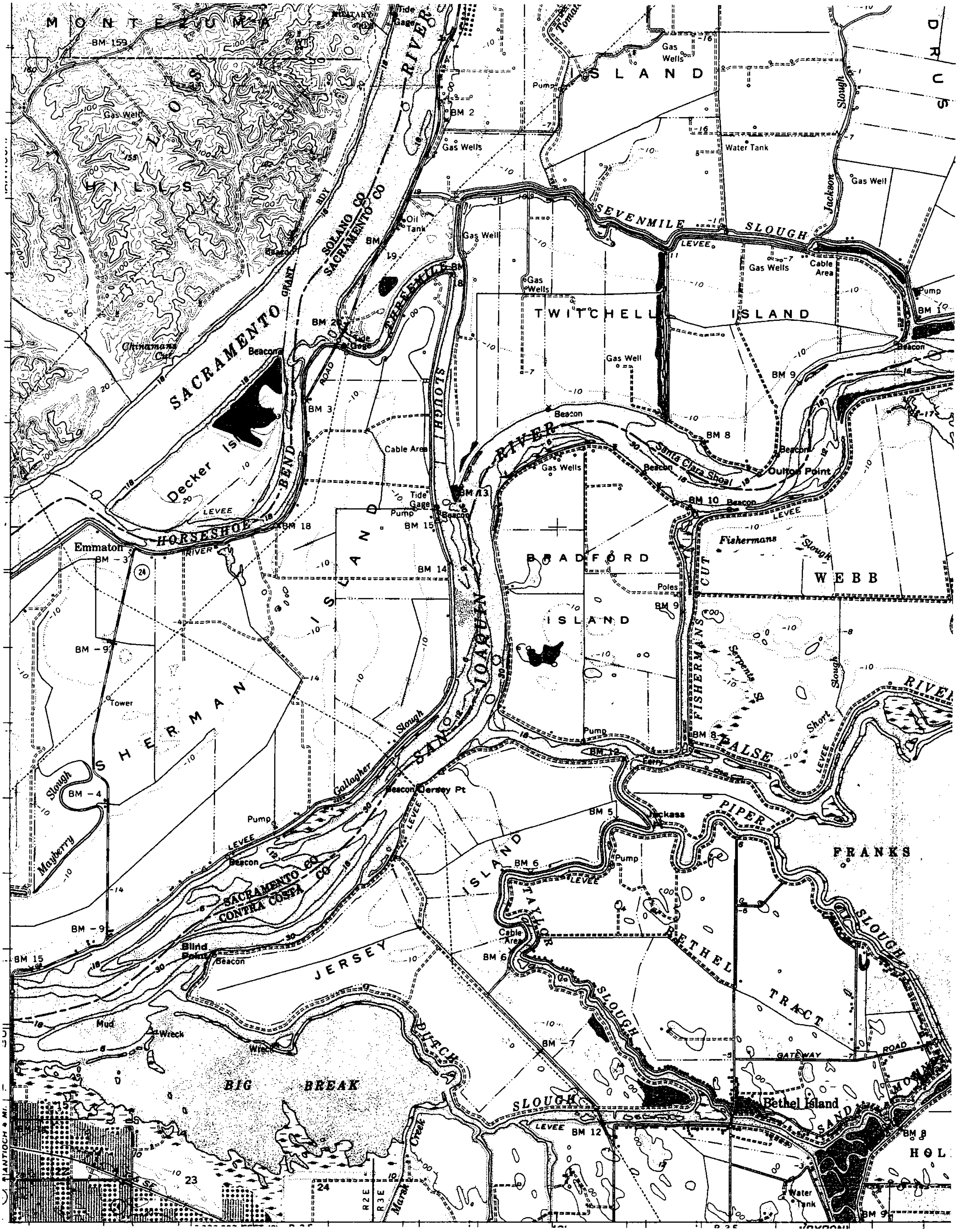
Topographic Maps
A topographic map (topo) is a color coded line-and-symbol representation of natural and selected artificial features plotted to a scale. Topos show the shape, elevation, and development of the terrain in precise detail by using contour lines and color coded symbols. Many features are shown by lines that may be straight, curved, solid, dashed, dotted, or in any combination. The colors of the lines usually indicate similar classes of information. For example, topographic contours (brown); lakes, streams, irrigation ditches, etc. (blue); land grids and important roads (red); secondary roads and trails, railroads, boundaries, etc. (black); and features that have been updated using aerial photography, but not field verified, such as disturbed land areas (e.g., gravel pits) and newly developed water bodies (purple).

For more than a century, the USGS has been creating and revising topographic maps for the entire country at a variety of scales. There are about 60,000 U.S. Geological Survey (USGS) produced topo maps covering the United States. Each map covers a specific quadrangle (quad) defined as a four-sided area bounded by latitude and longitude. Historical topographic maps are a valuable historical resource for documenting the prior use of a property and its surrounding area, and due to their frequent availability can be particularly helpful when other standard historical sources (such as city directories, fire insurance maps, or aerial photographs) are not reasonably ascertainable.

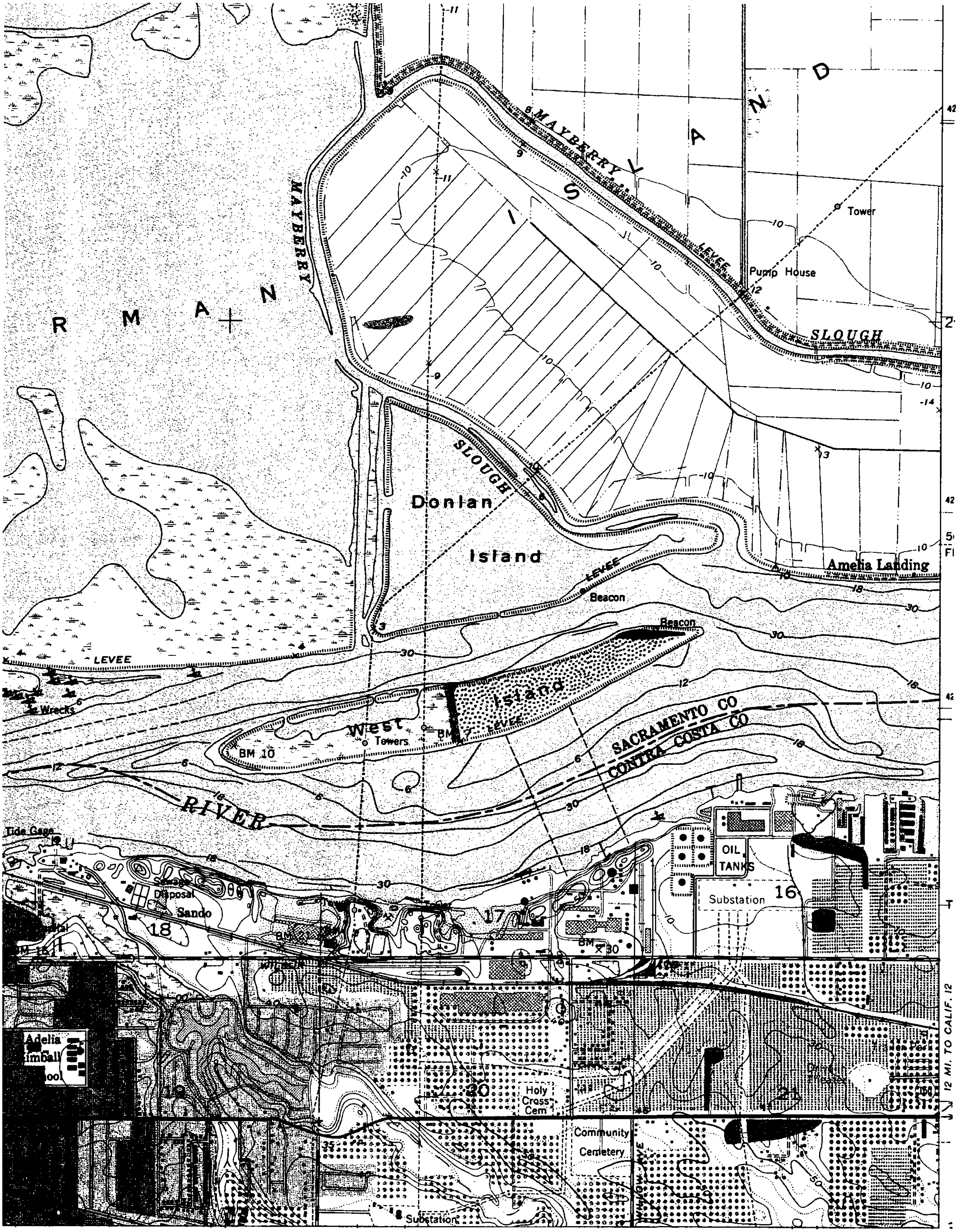


N ^ EDR INQUIRY# 1502948.4 TARGET QUAD: JERSEYISLAND YEAR: 1910 Series: 7.5' Scale: 1:31,680

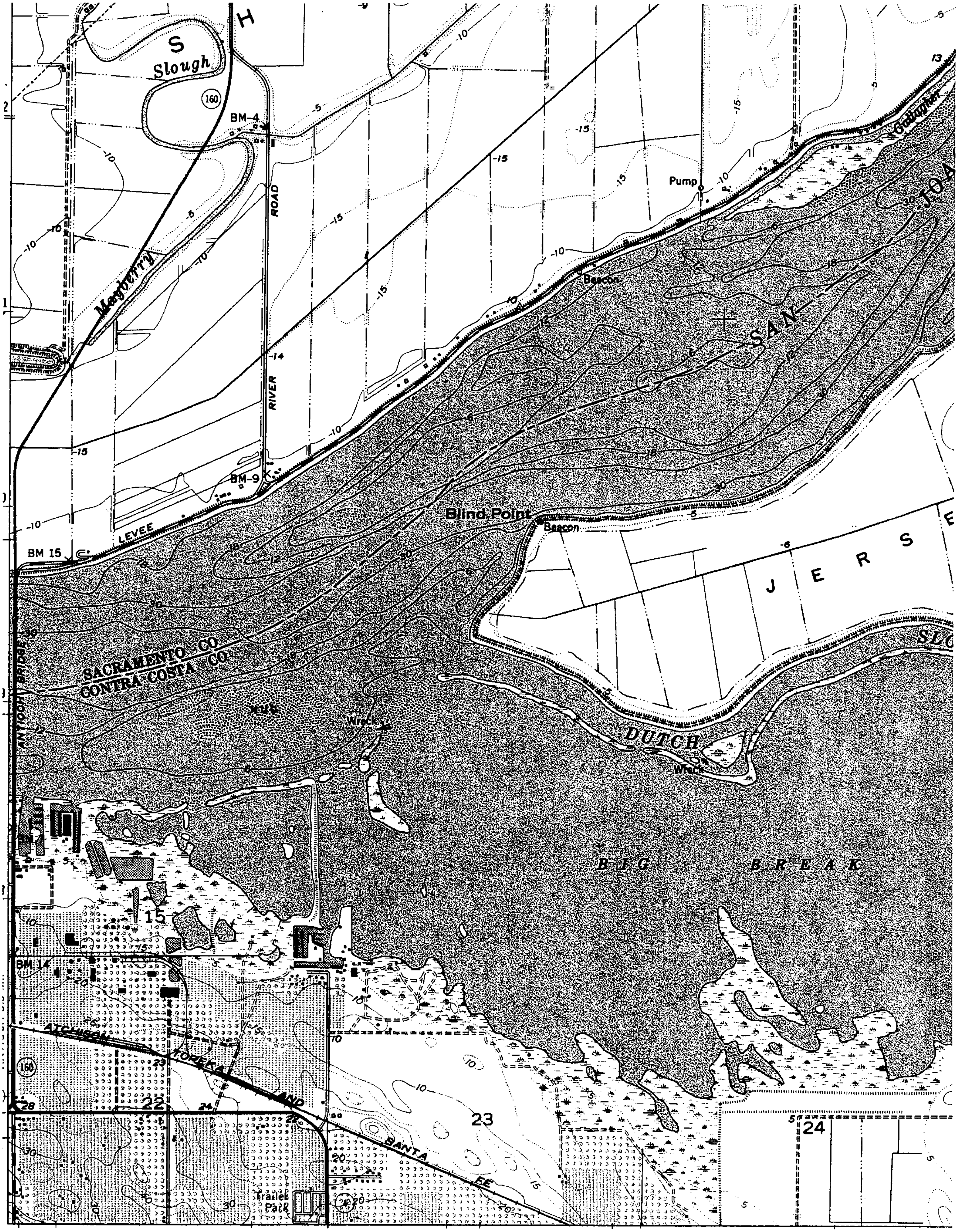
N ^ EDR INQUIRY# 1502948.4 ADJOINING QUAD: PITTSBURG YEAR: 1953 Series: 15' Scale: 1:62,500



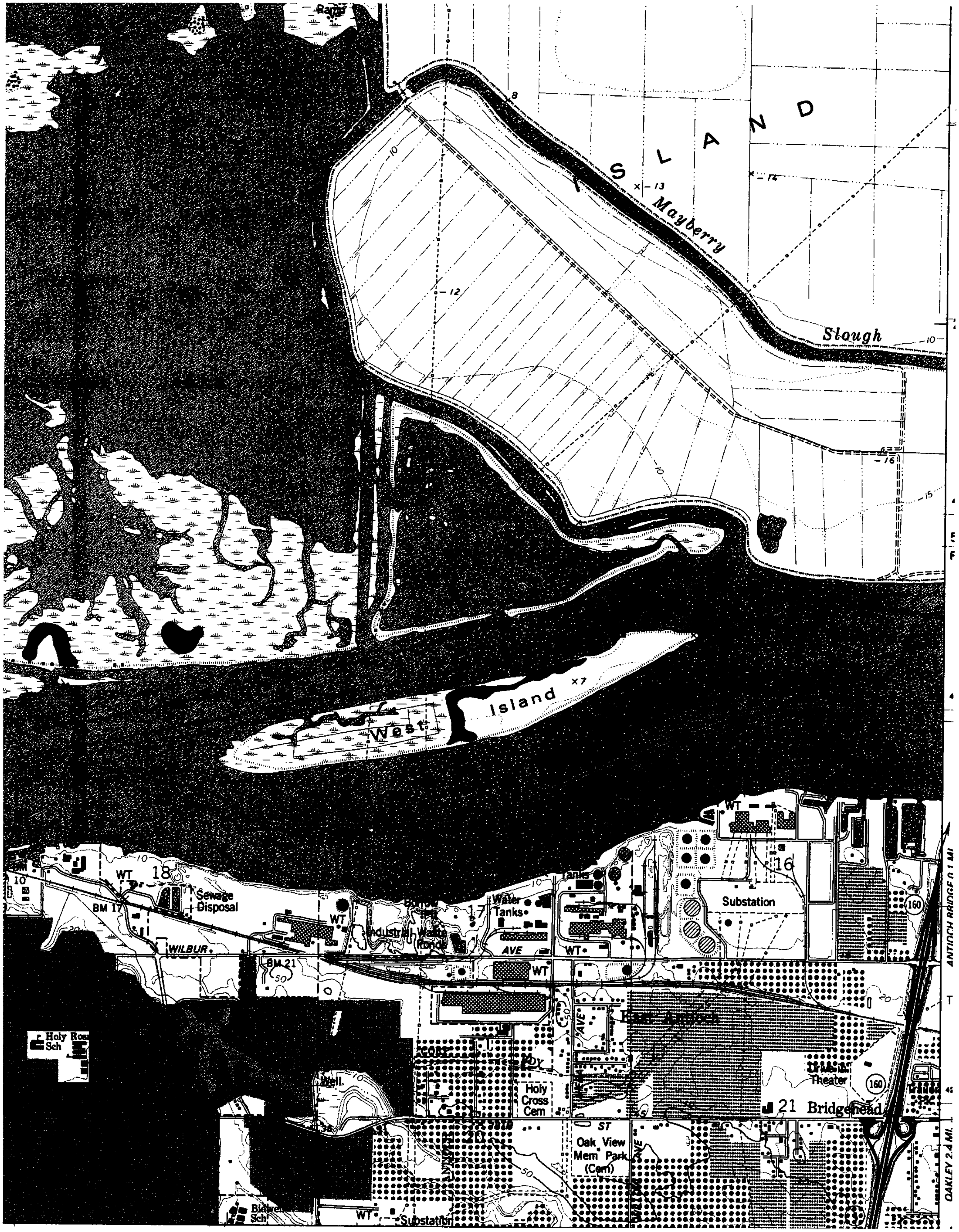
N ^ EDR INQUIRY# 1502948.4 TARGET QUAD: RIOVISTA YEAR: 1952 Series: 15' Scale: 1:62,500



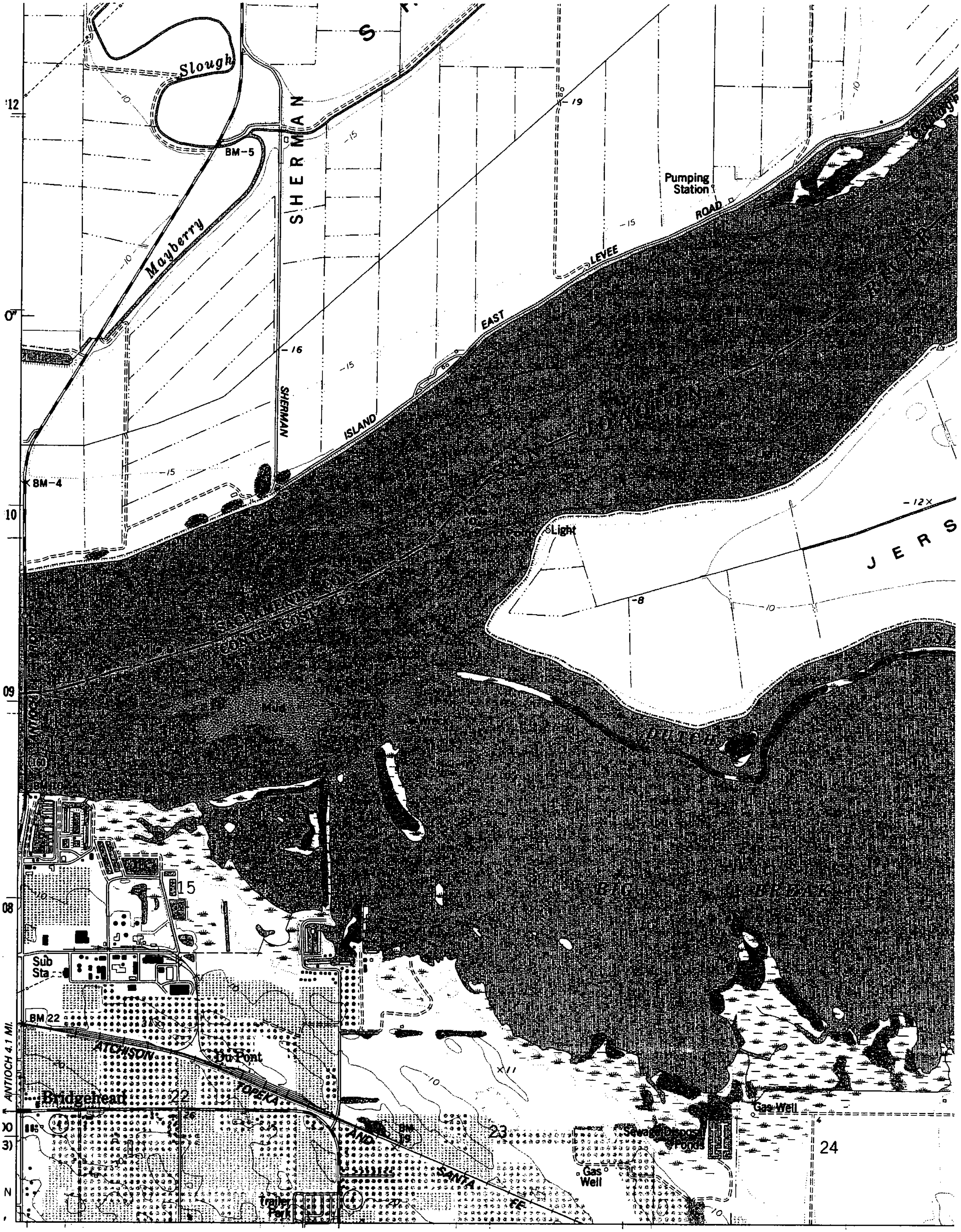
N ^ EDR INQUIRY# 1502948.4 ADJOINING QUAD: ANTIOCHNORTH PhotoRevised: 1953-1968 Series: 7.5' Scale: 1:24,000



N ^ EDR INQUIRY# 1502948.4 TARGET QUAD: JERSEYISLAND PhotoRevised: 1952-1968 Series: 7.5' Scale: 1:24,000



N ^ EDR INQUIRY# 1502948.4 ADJOINING QUAD: ANTIOCHNORTH YEAR: 1978 Series: 7.5' Scale: 1:24,000



N ^ EDR INQUIRY# 1502948.4 TARGET QUAD: JERSEYISLAND YEAR: 1978 Series: 7.5' Scale: 1:24,000

EDR® Environmental
Data Resources Inc

The EDR-City Directory
Abstract

**The Standard
In Environmental
Risk Management
Information**

**Bridgehead Road and Main Street
60 Big Break Rd
Oakley, CA 94561**

September 14, 2005

Inquiry Number: 1502948-5

440 Wheelers Farms Road
Milford, Connecticut 06460

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802

Environmental Data Resources, Inc.
City Directory Abstract

Environmental Data Resources, Inc.'s (EDR) City Directory Abstract is a screening tool designed to assist professionals in evaluating potential liability on a target property resulting from past activities. ASTM E 1527-00, Section 7.3 on Historical Use Information, identifies the prior use requirements for a Phase I environmental site assessment. The ASTM standard requires a review of *reasonably ascertainable standard historical sources. Reasonably ascertainable means information that is publicly available, obtainable from a source with reasonable time and cost constraints, and practically reviewable.*

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EDR's City Directory Abstract includes a search and abstract of available city directory data.

City Directories

City directories have been published for cities and towns across the U.S. since the 1700s. Originally a list of residents, the city directory developed into a sophisticated tool for locating individuals and businesses in a particular urban or suburban area. Twentieth century directories are generally divided into three sections: a business index, a list of resident names and addresses, and a street index. With each address, the directory lists the name of the resident or, if a business is operated from this address, the name and type of business (if unclear from the name). While city directory coverage is comprehensive for major cities, it may be spotty for rural areas and small towns. ASTM E 1527-00 specifies that a *"review of city directories (standard historical sources) at less than approximately five year intervals is not required by this practice." (ASTM E 1527-00, Section 7.3.2.1, page 12.)*

NAICS (North American Industry Classification System) Codes

NAICS is a unique, all-new system for classifying business establishments. Adopted in 1997 to replace the prior Standard Industry Classification (SIC) system, it is the system used by the statistical agencies of the United States. It is the first economic classification system to be constructed based on a single economic concept. To learn more about the background, the development and difference between NAICS and SIC, visit the following Census website: http://www.census.gov/epcd/www/naicsdev.htm.

Please call EDR Nationwide Customer Service at
1-800-352-0050 (8am-8pm EST)
with questions or comments about your report.
Thank you for your business!

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4. SUMMARY

- ***City Directories:***

Business directories including city, cross reference and telephone directories were reviewed, if available, at approximately five year intervals for the years spanning 1970 through 2005. (These years are not necessarily inclusive.) A summary of the information obtained is provided in the text of this report.

Date EDR Searched Historical Sources:

City Directories Sep 14, 2005

Target Property:

60 Big Break Rd
Oakley, CA 94561

PUR ID *Year*	*Uses*	*NAICS*	*Source*
-- 1970	Street not listed in research source.	N/A	Haines Criss-Cross Directory
-- 1975	Street not listed in research source.	N/A	Haines Criss-Cross Directory
-- 1980	Street not listed in research source.	N/A	Haines Criss-Cross Directory
-- 1985	Street not listed in research source.	N/A	Haines Criss-Cross Directory
-- 1990	Address not Listed in Research Source	N/A	Haines Criss-Cross Directory
-- 1995	Address not Listed in Research Source	N/A	Haines Criss-Cross Directory
-- 2000	Address not Listed in Research Source	N/A	Haines Criss-Cross Directory
-- 2005	Address not Listed in Research Source	N/A	Haines Criss-Cross Directory

Adjoining Properties

SURROUNDING

Big Break Road
Oakley, CA 94561

PUR ID *Year*	*Uses*	*NAICS*	*Source*
1970	Street not listed in research source.	N/A	Haines Criss-Cross Directory
1975	Street not listed in research source.	N/A	Haines Criss-Cross Directory
1980	Street not listed in research source.	N/A	Haines Criss-Cross Directory
1985	Street not listed in research source.	N/A	Haines Criss-Cross Directory
1990	Address not Listed in Research Source	N/A	Haines Criss-Cross Directory
1995	****Big Break Road**** Residence (3) Foundation Construction & Equipment Rental (81) Residence (86) Residence (96) No other addresses in range		Haines Criss-Cross Directory
2000	****Big Break Road****		Haines Criss-Cross Directory

PUR ID Year	Uses	NAICS	Source
2000 (continued)			
	Residence (3)		
	Foundation Construction & Equipment Rental (81)		
	Residence (86)		
	Residence (96)		
	No other addresses in range		
2005	**Big Break Road**		Haines Criss-Cross Directory
	Residence (3)		
	Foundation Construction & Equipment Rental (81)		
	Residence (86)		
	Residence (96)		
	No other addresses in range		

Appendix O

Project Site Limited Phase II Environmental Site Assessment

KLEINFELDER
An employee owned company

May 14, 2007
File No.: 61102/PH2

Mr. Shell MacPherson
PACLAND, Inc.
2901 Douglas Boulevard
Roseville, California 95661

Subject: **Limited Phase II Environmental Site Assessment (ESA)**
Proposed Retail #3718-00 – 76.4-Acre Property
Bridgehead Road and Main Street (Highway 4)
Oakley, California

Dear Mr. MacPherson:

This report presents the results of a Phase II Environmental Site Assessment for the property located at the Bridgehead Road and Main Street in Oakley, California, as shown on Plate 1.

SITE DESCRIPTION

The Site is approximately 76 acres in area, and is currently used as a vineyard. The Site is bounded to the northeast by railroad tracks, to the west by Bridgehead Road and to the south by Main Street.

BACKGROUND

Kleinfelder prepared a Phase I ESA of the subject property for PACLAND, dated February 23, 2006. The site is currently used primarily as a vineyard. We understand that the subject site will be acquired for commercial redevelopment. Recommendations in the previous Phase I ESA included the following:

- Due to the historical agricultural use of the site, pesticides and fertilizers have likely been applied to the land surface. The subject site has been included in several past assessments in which soils samples were collected and analyzed for organochlorine pesticides. Several pesticides were detected in those soil

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ATTORNEY CLIENT COMMUNICATION
ATTORNEY WORK PRODUCT

samples, however reported concentrations were below residential Preliminary Remediation Goals set by USEPA, Region IX (PRGs). Due to the time lapsed since those assessments and the sample locations bias to the perimeter of the site, Kleinfelder recommends that further soil sampling be conducted at the site to investigate the potential for pesticide-impacted soils.

- Delta Scrap & Salvage, located at 1371 Main Street, is adjacent to the south of the site. Delta Scrap & Salvage has been used to crush and recycle vehicles. Our experience with environmental investigations of auto salvage businesses in this area, and their reputations for having poor waste handling practices, both indicate the potential for a release of petroleum products from the Delta Scrap & Salvage facility. To evaluate the possibility of a release from this site, Kleinfelder recommends the collection of groundwater samples from near the southern boundary of the site directly across Highway 4 from the Delta Scrap facility.

To further evaluate the above-described recognized environmental conditions (RECs) identified at the subject site in the Phase I ESA, Kleinfelder performed a field investigation, including the sampling and analysis of soil and groundwater collected from the site.

PURPOSE AND SCOPE OF WORK

The purpose of this assessment is to evaluate the soil and groundwater underlying the Site for the presence of contamination. The scope of work included the collection and chemical analysis of soil and groundwater samples, and the preparation of this report. This work was performed in general accordance with our proposal to you dated September 19, 2006.

Surface Soil Sampling

Kleinfelder conducted surface sampling for pesticides in general accordance with California Department of Toxic Substances Control (DTSC) guidelines (Interim Guidance for Sampling Agricultural Fields for School Sites) as modified at the request of outside environmental counsel. The purpose of this subtask was to assess possible contamination of the site surface soil from the use of agricultural pesticides.

Subsurface Soil and Groundwater Sampling

Kleinfelder conducted drilling activities, including the collection of subsurface soil and groundwater samples, to assess possible impacts to the site from the up-gradient Delta Scrap & Salvage, auto salvage business. Samples were collected in order to assess potential migration of contaminants from the up-gradient auto salvage business to beneath the subject site through shallow groundwater.

SAMPLE COLLECTION

Surface Soil Sampling

On January 22 and 23, 2007, Kleinfelder collected surface soil samples at 75 on-site locations (See Plate 2). Samples were collected by manually advancing a stainless steel tube into the soil. Soil samples were sealed on both ends with Teflon sheets and end caps, labeled, and placed in a cooler packed with water-based ice pending delivery to a California state-certified analytical laboratory under chain of custody protocol. Soil sampling equipment was decontaminated between sample intervals and locations.

Soil and Groundwater Sampling

Prior to the start of drilling activities, Kleinfelder obtained two drilling permits from Contra Costa Health Services Environmental Health Division. Copies of the drilling permits are included in Appendix C. Kleinfelder called Underground Service Alert more than 48 hours before drilling to identify and contact utility companies with underground facilities in the investigation area. Additionally, Cruz Brothers Locators cleared the locations of the three borings for underground utilities and obstructions using geophysical equipment.

The planned boring depths (16 to 24 feet below ground surface (bgs)) were selected based on the anticipated depth of groundwater, which was expected to range from 12 to 20 feet bgs, based on data from nearby borings and wells. Following first encountered groundwater, one additional 4-foot soil core was to be collected and logged. The additional boring depth was to allow for accumulation of groundwater within the bore hole in order to facilitate the collection of a groundwater sample. Sample locations are shown on Plate 2.

On January 29, 2007 Kleinfelder collected soil and groundwater samples at three locations (see Plate 2). Resonant Sonic, Inc. of Woodland, California, provided drilling services for the three locations using a truck-mounted Geoprobe (direct-push) drill rig. The direct push rig advances a four-foot long steel tube using a hydraulic cylinder (and a vibratory hammer when necessary). The steel tube has an inside diameter of two inches and an interchangeable acrylic liner, which allows for a continuous sample through the entire depth of the borehole.

Three borings were advanced to between 16 and 24 feet bgs. Soil was collected in acrylic liners and inspected for indications of staining or odors. The continuous soil samples were logged in the field using the Unified Soil Classification System. The soil penetrated was predominantly sand, with some silty clay. The soil boring logs are included in Appendix D.

Soil samples were generally collected at a depth of approximately 4 feet bgs in each boring for a total of three soil samples. Soil samples were screened for organic vapors using a photo-ionization detector (PID) and sealed on both ends with Teflon sheets and end caps, labeled, and placed in a cooler packed with water based ice pending delivery to a California state-certified analytical laboratory under chain of custody protocol. Soil sampling equipment was decontaminated between sample intervals and locations.

Groundwater was encountered at depths ranging from 10 to 19 feet bgs. Temporary 3/4-inch poly vinyl chloride (PVC) well casing and screen was inserted into each borehole to collect groundwater samples. Groundwater samples were collected using disposable bailers. Groundwater samples were placed in laboratory-supplied containers, labeled, and stored in a cooler packed with water-based ice for delivery to the analytical laboratory under chain-of-custody protocol.

Groundwater sampling equipment was decontaminated between sample locations. After groundwater samples were collected, each borehole was abandoned according to well permit requirements. Temporary well casings were removed and discarded.

CHEMICAL ANALYSIS

Soil and groundwater samples were submitted to McCampbell Analytical, Inc., a California state-certified analytical laboratory, under chain-of-custody protocol for the following analyses:

- Surface Soil Samples
  - Organochlorine Pesticides by US EPA Method 8081B; and
  - Arsenic Lead and Mercury by EPA Method 6010A.
- Soil and groundwater samples
  - Volatile Organic Compounds (VOCs) by US EPA Method 8260B;
  - Total petroleum hydrocarbons as gasoline, diesel and motor oil (TPH-g, TPH-d and TPH-mo) by US EPA Method 8015M; and
  - Title 22 (CAM 17) Metals by EPA Method 6010C (Metals analysis performed on soil samples only).

RESULTS

Surface Soil Analysis

As instructed by Kleinfelder, the analytical laboratory created a total of twenty five (25), three-point composite samples for testing. The analytical results of the surface soil sample analyses are summarized in Table 1 and attached in Appendix A.

Concentrations of organochlorine pesticides were not detected in the surface samples, with the exception of dichlorodiphenyldichloroethylene (p,p-DDE) and dichlorodiphenyltrichloroethane (p,p-DDT). P,p-DDT was detected in a total of four samples, at concentrations up to 0.0013 milligrams per kilogram (mg/kg). P,p-DDE was detected in a total of eleven samples, at concentrations up to 0.0066 mg/kg. P,p-DDT and P,p-DDE concentrations detected were below their California Human Health Screening Levels (CHHSLs) set at 1.6 mg/kg and 6.3 mg/kg for residential land use and commercial/industrial land use, respectively.

Arsenic was detected in each of the surface samples at concentrations ranging from 1.9 to 5.0 mg/kg. Arsenic concentrations detected exceeded the CHHSLs for arsenic set at 0.07 mg/kg and 0.24 mg/kg for residential land use and commercial/industrial land use, respectively. However, arsenic concentrations were within the range of naturally occurring background concentrations, according to U.S. Geological Survey Professional Paper 1270 and the Lawrence Berkeley National Laboratory Environmental Restoration Program, 1995, City of Oakland Survey of Background Metal Concentration Studies.

Lead was detected in each of the surface samples at concentrations ranging from 6.3 to 21 mg/kg. Lead concentrations detected were below the CHHSL for lead set at 150 mg/kg and 3,500 mg/kg for residential land use and commercial/industrial land use, respectively.

Mercury was detected in one surface sample (B6 B7 C6) at 0.053 mg/kg. The mercury concentration detected was below the CHHSL for mercury set at 18 mg/kg and 180 mg/kg for residential land use and commercial/industrial land use, respectively.

Subsurface Soil and Groundwater Analysis

The results of the subsurface soil sample analyses are summarized in Table 2. The results of the groundwater sample analyses are summarized in Table 3. The laboratory analytical reports from McCampbell Analytical, Inc. are attached in Appendix B. Kleinfelder compared the analytical results to CHHSLs and the San Francisco Bay Regional Water Quality Control Board's (RWQCB) Environmental Screening Levels (ESLs). The ESLs referenced are for residential sites where groundwater is a current or potential source of drinking water. ESLs do not represent regulatory limits for contaminant concentrations, rather they provide a guideline on which to base recommendations.

A total of three soil samples, one from each soil boring, were analyzed for a basic target list of volatile organic compounds (VOCs), petroleum hydrocarbons and metals. VOCs and total petroleum hydrocarbons (TPH) were not detected at or above laboratory reporting limits. The seventeen Title 22 metals analyzed not detected above the laboratory reporting limit or were reported in the soil samples at concentrations below ESLs and CHHLs, with the exception of arsenic. Arsenic concentrations were within the range of naturally occurring background concentrations, according to U.S. Geological Survey Professional Paper 1270 and the Lawrence Berkeley National Laboratory Environmental Restoration Program, 1995, City of Oakland Survey of Background Metal Concentration Studies.

A total of three groundwater samples were submitted for analysis for VOCs and TPH. VOCs and petroleum hydrocarbons were not detected at or above laboratory reporting limits, with the exception of TPH in the diesel range in sample B-2. TPH diesel was detected in sample B-2 at a concentration of 53 micrograms per liter (µg/L), which is below the ESL for diesel of 100 µg/L.

CONCLUSIONS AND RECOMMENDATIONS

The results of surface soil samples analysis were compared with CHHSLs for residential and commercial/industrial land use in order to evaluate the significance of organochlorine pesticides, arsenic, lead and mercury contamination of the surface soils at the site. CHHSLs address concerns related to direct exposure to contaminants and provide a guideline on which to base recommendations. Concentrations of organochlorine pesticides, lead and mercury detected in the composite soil samples from the site were below their respective CHHSLs. Arsenic was detected at concentrations above its CHHSL, however the arsenic concentrations were within the range of naturally occurring arsenic concentrations in soils for the region. The site does not appear to be significantly impacted by residual agricultural organochlorine pesticides, arsenic, and/or mercury.

The results of soil and groundwater samples analysis were compared with CCHSLs and ESLs for residential and industrial/commercial land use in order to evaluate the significance of VOC, TPH and metal contamination of the site. ESLs do not represent regulatory limits for contaminant concentrations, rather they provide a guideline on which to base recommendations. Concentrations of VOC, TPH and metals detected in the soil and groundwater samples from the site were below their respective ESLs. Arsenic was above its CHHSL; however, arsenic concentrations were within the range of naturally occurring background concentrations. The site does not appear to be significantly impacted by the Delta Scrap operation on the south side of Highway 4.

Based on these results Kleinfelder does not recommend further environmental investigations at this time.

LIMITATIONS

The work described herein was performed in accordance with the proposed scope approved by our Client. Environmental issues not specifically addressed in this report were beyond the scope of our services and not included in our evaluation. The findings and recommendations in this report are made based upon the analytical results, field observations, and our professional judgment. It is possible that unforeseen events or conditions could occur that may limit the effectiveness of the assessment. Although risk can never be completely eliminated, more detailed and extensive investigations yield more information, which may help the Client understand and better manage risks. Since such detailed services involve greater expense, we ask our clients to participate in identifying the level of service, which will provide them with an acceptable level of risk. Please contact the signatories of this report if you would like to discuss this issue of risk further.

This report is certified to, can be relied upon by, and has been prepared for the exclusive use of the following entities; Pacland, Inc., (Client), the Law Office of John D. Edgcomb, Wal-Mart Real Estate Business Trust, a Delaware statutory trust, and Wal-Mart Stores, Inc., and their respective successors, assigns, affiliates, and subsidiaries. Any of the named entities above can convey this report to an affiliate, related entity, subsidiary, lender, title insurer, regulatory/city agency or current property owner(s) and their agents, but reliance upon or further dissemination of this report requires prior written approval from Kleinfelder. Based on the intended use of the report, Kleinfelder may decline certification to and reliance by non-Wal-Mart related entities, including successors, assigns, lenders, title insurers, regulatory/city agencies or current property owner(s) and their agents, unless additional work is performed and an updated report issued. Non-compliance with any of these requirements by the Client or anyone else, unless specifically agreed to in advance by Kleinfelder in writing, will release Kleinfelder from any liability resulting from the use of this report by any unauthorized party.

This report may be used only by the Client and above-named entities. Land or facility use, on- and off-site conditions, regulations, or other factors may change over time, and additional work may be required with the passage of time or any material change in circumstances. Since site activities and regulations beyond our control could change at any time after the completion of this report, our observations, findings, and opinions can be considered reliable as of the date of the site visit, but may be limited by material changes in site circumstances.

Kleinfelder has performed the services in a manner consistent with that level of care and skill ordinarily exercised by other members of our profession currently practicing in the same locality and under similar conditions, within the limitations of ASTM E 1527-05 standard, the All Appropriate Inquires Rule established by the U.S. Environmental Protection Agency (40 C.F.R. Part 312), and Wal-Mart's Environmental Due Diligence Policy dated August 2006.

CLOSING REMARKS

We appreciate the opportunity to work with you on this project. If you have any questions regarding this report, or if Kleinfelder may be of further assistance in implementing the above recommendations, please call Jim Lehrman at (925) 484-1700, Ext 204.

Sincerely,

KLEINFELDER WEST, INC.

FOR

Mehagan Hopkins
Staff Environmental Professional

James A. Lehrman, PG, CHG, REA
Environmental Group Manager

MH/JAL/jmk

Attachments: Table 1 – Summary of Surface Soil Analytical Data
Table 2 – Summary of Soil Boring Analytical Data
Table 3 – Summary of Groundwater Analytical Data
Plate 1 – Site Vicinity Map
Plate 2 – Site Plan with Sample Locations
Plates 3 – 6 – Soil Boring Logs
Appendix A – Surface Soil Laboratory Analytical Report
Appendix B – Soil and Groundwater Laboratory Analytical Report
Appendix C – Drilling Permits

PRIVILEGED & CONFIDENTIAL
ATTORNEY CLIENT COMMUNICATION
ATTORNEY WORK PRODUCT

TABLE 1
SUMMARY OF SURFACE SOIL ANALYTICAL DATA
BRIDGEHEAD ROAD AND MAIN STREET
OAKLEY, CALIFORNIA

			Organochlorine Pesticides (mg/kg)		**Metals** (mg/kg)		
			Method 8081B		Method 6010A		
			DDE	DDT	Arsenic	Lead	Mercury
SAMPLE ID # AND DATE(s)	A1 A2 B1	1/22/2007	ND	ND	*2.6*	13	ND
	A3 B2 B3	1/22/2007	ND	ND	*3.1*	12	ND
	A4 A5 B4	1/22/2007	ND	ND	*5.0*	11	ND
	B5 C4 C5	1/22/2007	ND	ND	*2.1*	8.8	ND
	B6 B7 C6	1/22/2007	ND	ND	*2.2*	8.5	0.053
	B8 B9 C8	1/22/2007 1/23/2007	0.0014	ND	*2.4*	8.5	ND
	C10 C11 C12	1/23/2007	0.0021	ND	*2.2*	9.9	ND
	C1 D1 D2	1/22/2007	ND	ND	*2.3*	13	ND
	C2 C3 D3	1/22/2007	ND	ND	*2.5*	10	ND
	D4 D5 E4	1/22/2007	ND	ND	*2.4*	11	ND
	C7 D6 D7	1/22/2007	ND	ND	*1.9*	6.3	ND
	C9 D8 D9	1/22/2007 1/23/2007	0.0066	0.0012	*2.0*	9.4	ND
	D10 D11 E10	1/23/2007	0.0042	0.0013	*2.5*	11	ND
	D12 E12 E13	1/23/2007	0.0038	0.0011	*2.4*	11	ND
	C13 D13 D14	1/23/2007	0.0020	ND	*2.4*	14	ND
	D15 D16 E15	1/23/2007	ND	ND	*4.0*	8.4	ND
	E5 F4 F5	1/22/2007	ND	ND	*2.4*	21	ND
	E6 F6 F7	1/22/2007	ND	ND	*2.2*	7.5	ND
	E7 E8 F8	1/22/2007	0.0026	ND	*2.0*	8.6	ND
	E9 F9 F10	1/23/2007	0.0045	0.0010	*2.0*	11	ND
	E11 F11 F12	1/23/2007	0.0034	ND	*2.6*	13	ND
	E14 F13 F14	1/23/2007	0.0027	ND	*2.0*	14	ND
	E16 F15 F16	1/23/2007	ND	ND	*2.3*	8	ND
	E17 E18 F17	1/23/2007	ND	ND	*2.3*	13	ND
	F18 F19 F20	1/23/2007	0.0016	ND	*2.2*	14	ND
CHHSLs	Residential Land Use		1.6	1.6	*0.07*	150	18.0
	Commercial/Industrial Land Use		6.3	6.3	*0.24*	3,500	180

Samples collected on 1/29/07.
Samples analyzed by McCampbell Analytical, Inc. of Pittsburg, CA.
All laboratory data met EPA and laboratory specifications for quality assurance and quality control.

Notes:
mg/kg - Milligrams per kilogram
ug/L - Micrograms per Liter
--- Not Available
ND - Not Detected
TPH - Total Petroleum Hydrocarbons
STLC - Soluble Threshold Limit Concentration
TTLC - Total Hazardous Waste Limit
ESLs - Environmental Screening Levels
CHHSLs - California Human Health Screening Levels
Italics - At or above CHHSLs

TABLE 2
SUMMARY OFSUBSURFACE SOIL ANALYTICAL DATA
BRIDGEHEAD ROAD AND MAIN STREET
OAKLEY, CALIFORNIA

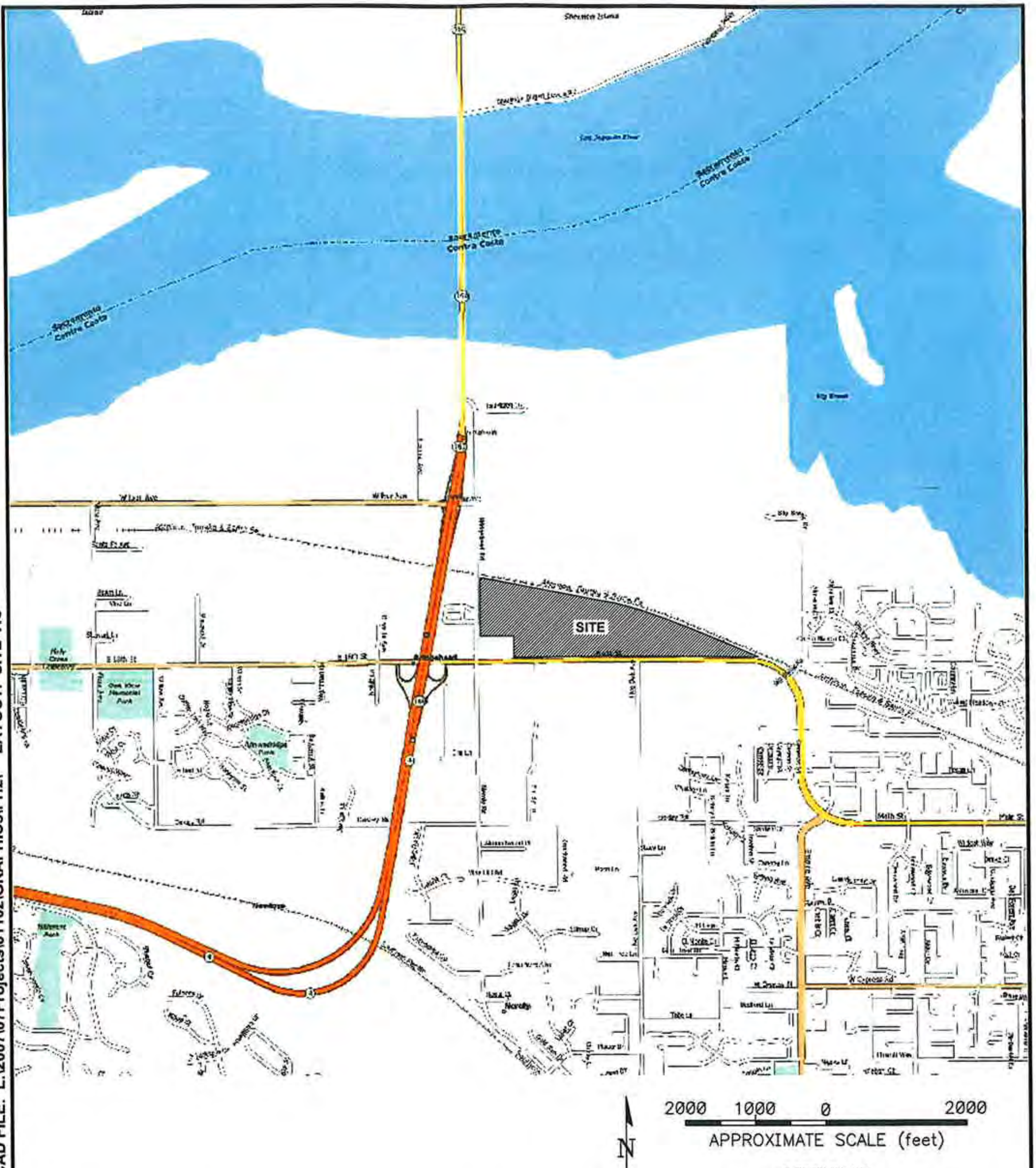
Analyte	Method	SAMPLE ID#, DEPTH AND DATE			RWQCB - ESLs		CHHSLs	
		B-1 4' 1/29/07	B-2 4' 1/29/07	B-3 4' 1/29/07	Residential Land Use	Industrial/ Commercial Land Use	Residential Land Use	Commercial/ Industrial Land Use
Volatile Organic Compounds (ug/kg)	8260B							
		ND	ND	ND	---	---	---	---
Petroleum Hydrocarbons (mg/kg)	8015M							
TPH (Gasoline)		ND	ND	ND	100	100	---	---
TPH (Diesel)		ND	ND	ND	100	100	---	---
TPH (Motor Oil)		ND	ND	ND	500	1,000	---	---
Metals (mg/kg)								
Antimony	6010A	ND	ND	ND	6.1	40	30	380
Arsenic	6010A	2.2	1.9	2.6	5.5	5.5	0.07	0.24
Barium	6010A	78	41	59	750	1,500	5,200	63,000
Beryllium	6010A	ND	ND	ND	4.0	8.0	150	1,700
Cadmium	6010A	ND	ND	ND	1.7	7.4	1.7	7.5
Chromium (total)	6010A	26	20	24	58	58	100,000	100,000
Cobalt	6010A	5.8	4.3	5.2	40	80	660	3,200
Copper	6010A	10	7.1	8.1	230	230	3,000	38,000
Lead	6010A	3.3	1.9	2.3	200	750	150	3,500
Mercury	7471A	0.053	ND	ND	2.5	10	18	180
Molybdenum	6010A	ND	ND	ND	40	40	380	4,800
Nickel	6010A	26	20	21	150	150	1,600	16,000
Selenium	6010A	ND	ND	ND	10	10	380	4,800
Silver	6010A	ND	ND	ND	20	40	380	4,800
Thallium	6010A	ND	ND	ND	1.0	13	5.0	63
Vanadium	6010A	36	34	36	110	200	530	6,700
Zinc	6010A	28	16	22	600	600	23,000	100,000

Samples collected on 1/29/07.
Samples analyzed by McCampbell Analytical, Inc. of Pittsburg, CA.
All laboratory data met EPA and laboratory specifications for quality assurance and quality control.

Notes: mg/kg - Milligrams per kilogram
ug/L - Micrograms per Liter
--- Not Available
ND - Not Detected
TPH - Total Petroleum Hydrocarbons
STLC - Soluble Threshold Limit Concentration
TTLC - Total Hazardous Waste Limit
ESLs - Environmental Screening Levels
RWQCB - Regional Water Quality Control Board
CHHSLs -California Human Health Screening Levels
BOLD - At or above TTLC, 10x STLC and/or ESL

TABLE 3
SUMMARY OF GROUNDWATER ANALYTICAL DATA
BRIDGEHEAD ROAD AND MAIN STREET
OAKLEY, CALIFORNIA

		SAMPLE ID #			RWQCB - ESLs
		B-1	B-2	B-3	
Sample Date		**1/29/07**	**1/29/07**	**1/29/07**	
Analyte	**Method**				
Volatile Organic Compounds (µg/L)	8260B				
		ND	ND	ND	---
Petroleum Hydrocarbons (µg/L)	8015M				
TPH (Gasoline)		ND	ND	ND	100
TPH (Diesel)		ND	53	ND	100
TPH (Motor Oil)		ND	ND	ND	100



REFERENCE:
www.mapquest.com, 2006

KLEINFELDER

7133 Koll Center Parkway, Suite 100
Pleasanton, CA 94566-3101
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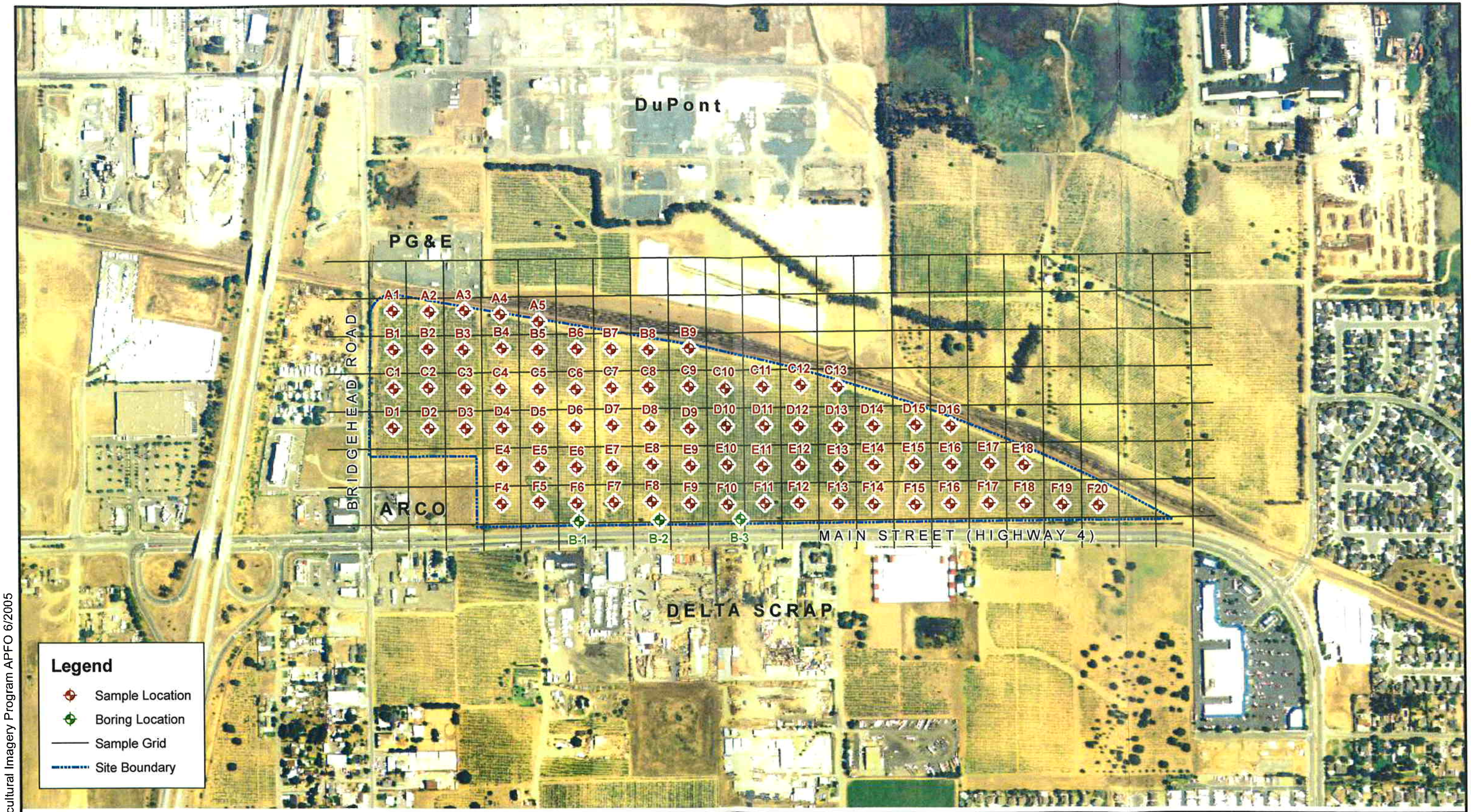
SITE VICINITY MAP

BRIDGEHEAD ROAD AND MAIN STREET
OAKLEY, CALIFORNIA

DRAWN BY:	L. Sue
REVISED BY:	
CHECKED BY:	M. Hopkins
PLATE	1

DRAWN: FEB 2007
APPROVED BY:
PROJECT NO. 61102-PH2
FILE NAME: SITE-VIC.dwg

ATTACHED IMAGES: Images: SITE-VIC.jpg Images: AERIAL.jpg
ATTACHED XREFS: XRef: Style A_08x11
Ple-L:\2007\07PROJ CAD FILE: L:\2007\07Projects\61102\GRAPHICs\PH2\ LAYOUT: SITE-VIC



IMAGERY: National Agricultural Imagery Program APFO 6/2005

N

0 200 400 800 1,200 Feet

1 inch equals 504.75 feet

1:6,057

DATE DRAWN: 2/2/2006

DATE REVISED:

DRAFTED BY: I.McGovern

CHECKED BY: M.Hopkins

APPROVED BY:

Site Plan With Sample Locations

BRIDGEHEAD ROAD AND MAIN STREET
OAKLEY, CALIFORNIA

PROJ NO. 61102-Ph2

FILE NAME: 61102-Ph2-2.mxd

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PLATE

2

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS		LTR	ID	DESCRIPTION	MAJOR DIVISIONS		LTR	ID	DESCRIPTION
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY	GW	▨	Well-graded gravels or gravel with sand, little or no fines	FINE GRAINED SOILS	SILTS AND CLAYS	ML	▨	Inorganic silts and very fine sands, rock flour or clayey silts with slight plasticity
		GP	▨	Poorly-graded gravels or gravel with sand, little or no fines			CL	▨	Inorganic lean clays of low to medium plasticity, gravelly clays, sandy clays, silty clays
		GM	▨	Silty gravels, silty gravel with sand mixture			OL	▨	Organic silts and organic silt-clays of low plasticity
		GC	▨	Clayey gravels, clayey gravel with sand mixture		SILTS AND CLAYS	MH	▨	Inorganic elastic silts, micaceous or diatomaceous or silty soils
	SAND AND SANDY	SW	▨	Well-graded sands or gravelly sands, little or no fines			CH	▨	Inorganic fat clays (high plasticity)
		SP	▨	Poorly-graded sands or gravelly sands, little or no fines			OH	▨	Organic clays of medium high to high plasticity
		SM	▨	Silty sand	HIGHLY ORGANIC SOILS		Pt	▨	Peat and other highly organic soils
		SC	▨	Clayey sand.					

☒	Geoprobe, Direct Push Sample
◪	Large Bore Discrete Soil Sampler, 1.5 in. O.D., 1.12 in. I.D.
■	Modified California Sampler, 2.5 in. O.D., 2 in. I.D.
▮	California Sampler, 3.0 in. dia.
▮	Shelby Tube 3.0 inch O.D.

▯	Blank casing
▤	Screened casing
▤	Cement grout
▨	Bentonite
▒	Sand pack or gravel pack
———	Sharp Contact (observed)
- - - - -	Inferred Contact (contact not observed)
|||||||||||	Gradational Contract (observed)
▽	Water level observed in boring
▼	Stabilized water level
NFWE	No free water encountered

OVA	Organic Vapor Analyzer
PID	Total organic vapors (parts per million) measured by a photo-ionization device
FID	Total Organic vapors (parts per million) measured by a flame-ionization device
NA	Not Applicable

Notes: Blow counts represent the number of blows a 140-pound hammer falling 30 inches required to drive a sampler through the last 12 inches of an 18 inch penetration.

The lines separating strata on the logs represent approximate boundaries only. The actual transition may be gradual. No warranty is provided as to the continuity of soil strata between borings. Logs represent the soil section observed at the boring location on the date of drilling only.

References to plasticity of cohesive soils are based on qualitative field observations and not on quantative field or laboratory tests. Qualitative soil plasticity is noted solely to aid in stratigraphic correlation and is not intended for geotechnical characterization of soils.

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PROJECT NO. **61102-PH2**

BORING LOG LEGEND

BRIDGEHEAD ROAD AND MAIN STREET
OAKLEY, CALIFORNIA

PLATE

3

2/16/2007 9:22:37 AM

Date Completed: **1/29/07**
Logged By: **J. Williams**
Total Depth: **16.0 ft**
North: **38.00536**
East: **-121.74661**

Drilling method: **Direct Push**
Hammer Wt:
Notes:
Surface Elevation:

Depth (feet)	Sample Number	Sample Type	Blows/Foot	Recovery (%)	OVA (ppm) PID	USCS	Description	Remarks
1							**SAND (SP)** - brown (10YR 4/3), moist, loose, fine grained sand, poorly graded	
2								
3								
4	B-1-4			75	0.2			
5								
6								
7								
8				75	0.3			
9								
10							**SAND (SP)** - olive-brown (2.5YR 4/3), saturated, loose, fine grained sand, poorly graded	∇ 10:40
11								
12				75	1.2		**SANDY SILT CLAY (CL)** - olive (5Y 4/3), moist, stiff	
13								
14								
15								
16				100	1.3		**Boring terminated at approximately 16 feet.**	
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

KLEINFELDER

PROJECT NO. **61102-PH2**

LOG OF BORING NO. B-1

BRIDGEHEAD ROAD AND MAIN STREET
OAKLEY, CALIFORNIA

PLATE
4

L:\2007\07PROJECTS\61102\61102.GPJ

Date Completed: 1/29/07
Logged By: J. Williams
Total Depth: 24.0 ft
North: 38.00537
East: -121.74503

Drilling method: Direct Push
Hammer Wt:
Notes:
Surface Elevation:

Depth (feet)	Sample Number	Sample Type	Blows/Foot	Recovery (%)	OVA (ppm) PID	USCS	Description	Remarks
1							**SAND (SP)** - dark yellowish-brown (10YR 4/4), moist, fine grained sand, poorly graded	
2								
3								
4	B-2-4			75	0.4			
5								
6								
7								
8				75	0.5			
9								
10							- dry, increasing silt content	
11								
12				75	0.5		**SAND (SP)** - olive-brown (2.5YR 4/4), wet, loose, fine grained sand, poorly graded	
13								
14								
15								
16				88	0.5		**SILTY CLAY (CL)** - olive-brown, moist, stiff	
17								
18							**SAND (SP)** - olive-brown, saturated, loose, fine grained sand, poorly graded	▽ 09:10
19								
20				100	2.3			
21								
22								
23							**SANDY CLAY (CL)** - olive-brown, moist, stiff	
24				100	0.3		**Boring terminated at approximately 24 feet.**	
25								
26								
27								
28								
29								
30								

KLEINFELDER

PROJECT NO. 61102-PH2

LOG OF BORING NO. B-2

BRIDGEHEAD ROAD AND MAIN STREET
OAKLEY, CALIFORNIA

PLATE
5

L:\2007\07PROJECTS\61102\61102.GPJ

Date Completed: **1/29/07**
Logged By: **J. Williams**
Total Depth: **24.0 ft**
North: **38.00538**
East: **-121.74343**

Drilling method: **Direct Push**
Hammer Wt:
Notes:
Surface Elevation:

Depth (feet)	Sample Number	Sample Type	Blows/Foot	Recovery (%)	OVA (ppm) PID	USCS	Description	Remarks
1							**SAND (SP)** - dark yellowish-brown (10YR 4/4), moist, loose, fine grained sand, poorly graded	
2								
3								
4	B-3-4			75	0.3			
5								
6								
7							- dry	
8				75	0.5			
9								
10							**SAND (SP)** - light olive-brown (2.5Y 5/4), dry, loose, fine grained sand, poorly graded	
11								
12				88	0.4			
13								
14								
15							- increasing silt content	
16				75	0.5			
17								
18							**SILTY CLAY (CL)** - olive-brown, moist, stiff	
19							**SILTY SAND (SM)** - olive-brown, wet, loose, poorly graded	09:25 ∇
20				100	0.4			
21	—							
22								
23								
24				100	0.3		**Boring terminated at approximately 24 feet.**	
25								
26								
27								
28								
29								
30								

KLEINFELDER

PROJECT NO. **61102-PH2**

LOG OF BORING NO. B-3

BRIDGEHEAD ROAD AND MAIN STREET
OAKLEY, CALIFORNIA

PLATE
6

McCampbell Analytical, Inc.
"When Quality Counts"

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Web: www.mccampbell.com E-mail: main@mccampbell.com
Telephone: 877-252-9262 Fax: 925-252-9269

Kleinfelder, Inc. 7133 Koll Center Pkwy, #100 Pleasanton, CA 94566	Client Project ID: #61102/PH2; Bridgehead Road & Main Street, Oakley	Date Sampled: 01/22/07
		Date Received: 01/23/07
	Client Contact: Jeff Salas	Date Reported: 01/29/07
	Client P.O.:	Date Completed: 01/29/07

WorkOrder: 0701448

January 29, 2007

Dear Jeff:

Enclosed are:

1). the results of **25** analyzed samples from your **#61102/PH2; Bridgehead Road & Main Street, Oakley project,**

2). a QC report for the above samples

3). a copy of the chain of custody, and

4). a bill for analytical services.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits.

If you have any questions please contact me. McCampbell Analytical Laboratories strives for excellence in quality, service and cost. Thank you for your business and I look forward to working with you again.

Best regards,

Angela Rydelius, Lab Manager

McCampbell Analytical, Inc.
1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

WorkOrder: 0701448 **ClientID: KFP**

☐ EDF ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty

Report to:

Jeff Salas
Kleinfelder, Inc.
7133 Koll Center Pkwy, #100
Pleasanton, CA 94566

Email:
TEL: (925) 484-1700 FAX: (925) 484-5838
ProjectNo: #61102/PH2; Bridgehead Road & Main
PO:

Bill to:

Accounts Payable
Kleinfelder Inc.
7133 Koll Center Pkwy, #100
Pleasanton, CA 94566

Requested TAT: **5 days**

Date Received: 01/23/2007
Date Printed: 01/23/2007

Sample ID	ClientSampID	Matrix	Collection Date	Hold	Requested Tests (See legend below) 1	2	3	4	5	6	7	8	9	10	11	12
0701448-001	A1 A2 B1	Soil	1/22/07 1:47:00 PM	☐	A	A										
0701448-002	A3 B2 B3	Soil	1/22/07 1:20:00 PM	☐	A	A										
0701448-003	A4 A5 B4	Soil	1/22/07 11:46:00	☐	A	A										
0701448-004	B5 C4 C5	Soil	1/22/07 11:39:00	☐	A	A										
0701448-005	B6 B7 C6	Soil	1/22/07 10:12:00	☐	A	A										
0701448-006	B8 B9 C8	Soil	1/22/07 8:30:00 AM	☐	A	A										
0701448-007	C10 C11 C12	Soil	1/23/07 8:37:00 AM	☐	A	A										
0701448-008	C1 D1 D2	Soil	1/22/07 1:37:00 PM	☐	A	A										
0701448-009	C2 C3 D3	Soil	1/22/07 1:30:00 PM	☐	A	A										
0701448-010	D4 D5 E4	Soil	1/22/07 11:36:00	☐	A	A										
0701448-011	C7 D6 D7	Soil	1/22/07 10:10:00	☐	A	A										
0701448-012	C9 D8 D9	Soil	1/22/07 10:38:00	☐	A	A										
0701448-013	D10 D11 E10	Soil	1/23/07 8:42:00 AM	☐	A	A										
0701448-014	D12 E12 E13	Soil	1/23/07 9:27:00 AM	☐	A	A										
0701448-015	C13 D13 D14	Soil	1/23/07 10:02:00	☐	A	A										

Test Legend:

1	8081_S	2	ASPBHGMS_S	3		4		5	
6		7		8		9		10	
11		12							

Prepared by: Melissa Valles

Comments:

NOTE: Samples are discarded 60 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

McCampbell Analytical, Inc.
1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 0701448 **ClientID: KFP**

☐ EDF ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty

Report to:
Jeff Salas
Kleinfelder, Inc.
7133 Koll Center Pkwy, #100
Pleasanton, CA 94566

Email:
TEL: (925) 484-1700 FAX: (925) 484-5838
ProjectNo: #61102/PH2; Bridgehead Road & Main
PO:

Bill to:
Accounts Payable
Kleinfelder Inc.
7133 Koll Center Pkwy, #100
Pleasanton, CA 94566

Requested TAT: **5 days**

Date Received: **01/23/2007**
Date Printed: **01/23/2007**

Sample ID	**ClientSampID**	**Matrix**	**Collection Date**	**Hold**	**Requested Tests (See legend below)**											
					1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
0701448-016	D15 D16 E15	Soil	1/23/07 10:35:00	☐	A	A										
0701448-017	E5 F4 F5	Soil	1/22/07 11:30:00	☐	A	A										
0701448-018	E6 F6 F7	Soil	1/22/07 9:42:00 AM	☐	A	A										
0701448-019	E7 E8 F8	Soil	1/22/07 10:30:00	☐	A	A										
0701448-020	E9 F9 F10	Soil	1/23/07 8:21:00 AM	☐	A	A										
0701448-021	E11 F11 F12	Soil	1/23/07 9:03:00 AM	☐	A	A										
0701448-022	E14 F13 F14	Soil	1/23/07 9:56:00 AM	☐	A	A										
0701448-023	E16 F15 F16	Soil	1/23/07 10:30:00	☐	A	A										
0701448-024	E17 E18 F17	Soil	1/23/07 10:56:00	☐	A	A										
0701448-025	F18 F19 F20	Soil	1/23/07 11:04:00	☐	A	A										

Test Legend:

1	8081_S	2	ASPBHGMS_S	3		4		5	
6		7		8		9		10	
11		12							

Prepared by: Melissa Valles

Comments:

NOTE: Samples are discarded 60 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

KLEINFELDER MT 0701440

PROJECT NO.	PROJECT NAME	NO. OF CON-TAINERS	TYPE OF CON-TAINERS	ANALYSIS		RECEIVING LAB
61102/PH2	Bridgehead Road & Main Street, Oakley					
L.P. NO. (P.O. NO.) —	SAMPLERS: (Signature/Number) Jeffrey D. Sola/4842 Melegan Ayers 7815					INSTRUCTIONS/REMARKS

	DATE MM/DD/YY	SAMPLE I.D. TIME HH-MM-SS	SAMPLE I.D.	MATRIX	NO. OF CON-TAINERS	TYPE OF CON-TAINERS	Organochlorine Pesticides (8081)	Total Lead, Arsenic, mercury. (6020)	INSTRUCTIONS/REMARKS
1	01/22/07	1354	A1	Soil	1	SS Tube			STANDARD T.A.T.
2		1347	A2				X	X	3 POINT COMPOSITE
3		1357	B1						
4		1320	A3						
5		1344	B2				X	X	3 POINT COMPOSITE
6		1326	B3						
7		1150	A4						
8		1146	A5				X	X	3 POINT COMPOSITE
9		1153	B4						
10		1142	B5						
11		1157	C4				X	X	3 POINT COMPOSITE
12		1139	C5						
13		1015	B6						
14		1050	B7				X	X	3 POINT COMPOSITE
15		1012	C6						
16		1046	B8						
17	1/23/07	0830	B9				X	X	3 POINT COMPOSITE
18	1/22/07	1041	C8						
19									
20									

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Instructions/Remarks:	Send Results To:
	1/23/07 1222	Maria V	ICE ✓ GOOD CONDITION ✓ HEAD SPACE ABSENT ___ DECHLORINATED IN LAB ___ APPROPRIATE CONTAINERS ✓ PRESERVED IN LAB ___ VOAS | O&G | METALS | OTHER PRESERVATION	KLEINFELDER 7133 KOLL CENTER PARKWAY SUITE 100 PLEASANTON, CA 94566 (925) 484-1700
Relinquished by: (Signature)	Date/Time	Received by: (Signature)		Attn:
Relinquished by: (Signature)	Date/Time	Received for Laboratory by: (Signature)		

M-60 White – Sampler Canary – Return Copy To Shipper Pink – Lab Copy

CHAIN OF CUSTODY

№ 4180

Page 1 of

KLEINFELDER

PROJECT NO. 61102 / PH2	PROJECT NAME BRIDGEHEAD ROAD & MAIN STREET, OAKLEY		RECEIVING LAB.
L.P. NO. (P.O. NO.) —	SAMPLERS: (Signature/Number) Jeffrey D. Sole/4842 Melegan Hopkins		INSTRUCTIONS/REMARKS

	DATE MM/DD/YY	SAMPLE I.D. TIME HH-MM-SS	SAMPLE I.D.	MATRIX	NO. OF CON-TAINERS	TYPE OF CON-TAINERS	ANALYSIS: ORGANOCHLORINE PESTICIDES (8081)	TOTAL LEAD, ARSENIC, MERCURY 6020	STANDARD T.A.T.
1	1/23/07	0837	C10	Soil	1	SS Tube			
2		0713	C11				X	X	3 POINT COMPOSITE
3	↓	0923	C12						
4	1/22/07	1359	C1						
5		1402	D1				X	X	3 POINT COMPOSITE
6		1337	D2						
7		1341	C2						
8		1330	C3				X	X	3 POINT COMPOSITE
9		1333	D3						
10		1200	D4						
11		1136	D5				X	X	3 POINT COMPOSITE
12		1203	E4						
13		1053	C7						
14		1010	D6				X	X	3 POINT COMPOSITE
15	↓	1056	D7						
16	1/23/07	0829	C9						
17	1/22/07	1038	D8				X	X	3 POINT COMPOSITE
18			D9						
19									
20									

Relinquished by: (Signature) Melegan	Date/Time 1/23/07 1212	Received by: (Signature) Maria V	Instructions/Remarks:	Send Results To:
Relinquished by: (Signature)	Date/Time	Received by: (Signature)		KLEINFELDER 7133 KOLL CENTER PARKWAY SUITE 100 PLEASANTON, CA 94566 (925) 484-1700
Relinquished by: (Signature)	Date/Time	Received for Laboratory by: (Signature)		Attn:

M-60 White - Sampler Canary - Return Copy To Shipper Pink - Lab Copy

CHAIN OF CUSTODY

№ 4176

Page 2 of

KLEINFELDER

PROJECT NO.: 61102/PH2

PROJECT NAME: BRIDGEHEAD ROAD & MAIN STREET, OAKLEY

L.P. NO. (P.O. NO.): —

SAMPLERS: (Signature/Number) Jeffrey D. Sala/A842 Mahogany Hopkins

RECEIVING LAB:

	DATE MM/DD/YY	SAMPLE I.D. TIME HH-MM-SS	SAMPLE I.D.	MATRIX	NO OF CON-TAINERS	TYPE OF CON-TAINERS	ANALYSIS: Organochlorine Pesticides (8081)	Total Lead, Arsenic, Mercury 6020	INSTRUCTIONS/REMARKS: STANDARD T.A.T.
1	1/23/07	0842	D10	Soil	1	SS TUBE			
2		0910	D11				X	X	3 POINT COMPOSITE
3		0846	E10						
4		0927	D12						
5		0931	E12				X	X	3 POINT COMPOSITE
6		0959	E13						
7		1005	C13						
8		1002	D13				X	X	3 POINT COMPOSITE
9		1011	D14						
10		1038	D15						
11		1042	D16				X	X	3 POINT COMPOSITE
12	↓	1035	E15						
13	1/23/07	1133	E5						
14		1206	F4				X	X	3 POINT COMPOSITE
15		1130	F5						
16		0954	E6						
17		0942	F6				X	X	3 POINT COMPOSITE
18	↓	1102	F7	↓	↓	↓			
19									
20									

Relinquished by: (Signature)	Date/Time	Received by: (Signature)
	1/23/07 1212	
Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received for Laboratory by: (Signature)

Instructions/Remarks:

Send Results To:

KLEINFELDER
7133 KOLL CENTER PARKWAY
SUITE 100
PLEASANTON, CA 94566
(925) 484-1700

Attn:

M-60 White - Sampler Canary - Return Copy To Shipper Pink - Lab Copy

CHAIN OF CUSTODY

№ 4177

page 3 of

KLEINFELDER

PROJECT NO. 61102/PH2

PROJECT NAME BRIDGE HEAD ROAD & MAIN STREET, OAKLEY

L.P. NO. (P.O. NO.) —

SAMPLERS: (Signature/Number) Jeffrey D. Sale/4842 [illegible] Hopkins

RECEIVING LAB:

INSTRUCTIONS/REMARKS: STANDARD T.A.T.

	DATE MM/DD/YY	SAMPLE I.D. TIME HH-MM-SS	SAMPLE I.D.	MATRIX	NO. OF CON-TAINERS	TYPE OF CON-TAINERS	ANALYSIS: organochlorine Pesticides (8081)	Total Lead, Arsenic, mercury (6020)	INSTRUCTIONS/REMARKS
1	1/22/07	1059	E7	SOIL	1	SS TUBE			
2		1033	E8				X	X	3 POINT COMPOSITE
3	↓	1030	F8						
4	1/23/07	0823	E9						
5		0821	F9				X	X	3 POINT COMPOSITE
6		0849	F10						
7		0906	E11						
8		0903	F11				X	X	3 POINT COMPOSITE
9		0934	F12						
10		1015	E14						
11		0956	F13				X	X	3 POINT COMPOSITE
12		1018	F14						
13		1045	E16						
14		1030	F15				X	X	3 POINT COMPOSITE
15		1048	F16						
16		1059	E17						
17		1102	E18				X	X	3 POINT COMPOSITE
18	↓	1056	F17	↓	↓	↓			
19									
20									

Relinquished by: (Signature)	Date/Time	Received by: (Signature)
	1/23/07 1217	Maria V
Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received for Laboratory by: (Signature)

Instructions/Remarks:

Send Results To:

KLEINFELDER
7133 KOLL CENTER PARKWAY
SUITE 100
PLEASANTON, CA 94566
(925) 484-1700

Attn:

M-60 White – Sampler Canary – Return Copy To Shipper Pink – Lab Copy

No 4178

Page

KLEINFELDER

PROJECT NO. 61102/PH2

PROJECT NAME Bridgehead Road & Main Street, Oakley

L.P. NO. (P.O. NO.) —

SAMPLERS: (Signature/Number) Jeffrey D. [illegible]/4842 [illegible] Hopkins

RECEIVING LAB:

	DATE MM/DD/YY	SAMPLE I.D. TIME HH-MM-SS	SAMPLE I.D.	MATRIX	NO. OF CON-TAINERS	TYPE OF CON-TAINERS	ANALYSIS: Organochlorine Pesticides (8081)	Total Lead, Arsenic, Mercury (6020)										INSTRUCTIONS/REMARKS STANDARD T.A.T.
1	1/23/07	1104	E18	Soil	1	SS TUBE												
2	↓	1110	E19	↓	↓	↓	X	X										3 POINT COMPOSITE
3	↓	1114	E20	↓	↓	↓												
4																		
5																		
6																		
7																		
8																		
9																		
10																		
11																		
12																		
13																		
14																		
15																		
16																		
17																		
18																		
19																		
20																		

Relinquished by: (Signature)	Date/Time	Received by: (Signature)
	1/23/07 1212	

Relinquished by: (Signature)	Date/Time	Received by: (Signature)

Relinquished by: (Signature)	Date/Time	Received for Laboratory by: (Signature)

Instructions/Remarks:

Send Results To:

KLEINFELDER
7133 KOLL CENTER PARKWAY
SUITE 100
PLEASANTON, CA 94566
(925) 484-1700

Attn:

M-60

White - Sampler

Canary - Return Copy To Shipper

Pink - Lab Copy

№ 4179

Page 5 of 5

McCampbell Analytical, Inc.
"When Quality Counts"

1534 Willow Pass Road, Pittsburg, CA 94565-1701
Web: www.mccampbell.com E-mail: main@mccampbell.com
Telephone: 877-252-9262 Fax: 925-252-9269

Kleinfelder, Inc. 7133 Koll Center Pkwy, #100 Pleasanton, CA 94566	Client Project ID: #61102/PH2; Bridgehead Road & Main Street, Oakley	Date Sampled: 01/22/07-01/23/07 Date Received: 01/23/07
	Client Contact: Jeff Salas	Date Extracted: 01/23/07
	Client P.O.:	Date Analyzed: 01/24/07-01/27/07

Organochlorine Pesticides by GC-ECD (8080 Basic Target List)*

Extraction Method: SW3550C Analytical Method: SW8081B Work Order: 0701448

Lab ID	0701448-001A	0701448-002A	0701448-003A	0701448-004A	Reporting Limit for DF =1	
Client ID	A1 A2 B1	A3 B2 B3	A4 A5 B4	B5 C4 C5		
Matrix	S	S	S	S	S	W
DF	1	1	1	1		
Compound	**Concentration**				mg/kg	µg/L
Aldrin	ND	ND	ND	ND	0.001	NA
a-BHC	ND	ND	ND	ND	0.001	NA
b-BHC	ND	ND	ND	ND	0.001	NA
d-BHC	ND	ND	ND	ND	0.001	NA
g-BHC	ND	ND	ND	ND	0.001	NA
Chlordane (Technical)	ND	ND	ND	ND	0.025	NA
a-Chlordane	ND	ND	ND	ND	0.001	NA
g-Chlordane	ND	ND	ND	ND	0.001	NA
p,p-DDD	ND	ND	ND	ND	0.001	NA
p,p-DDE	ND	ND	ND	ND	0.001	NA
p,p-DDT	ND	ND	ND	ND	0.001	NA
Dieldrin	ND	ND	ND	ND	0.001	NA
Endosulfan I	ND	ND	ND	ND	0.001	NA
Endosulfan II	ND	ND	ND	ND	0.001	NA
Endosulfan sulfate	ND	ND	ND	ND	0.001	NA
Endrin	ND	ND	ND	ND	0.001	NA
Endrin aldehyde	ND	ND	ND	ND	0.001	NA
Heptachlor	ND	ND	ND	ND	0.001	NA
Heptachlor epoxide	ND	ND	ND	ND	0.001	NA
Hexachlorobenzene	ND	ND	ND	ND	0.01	NA
Hexachlorocyclopentadiene	ND	ND	ND	ND	0.02	NA
Methoxychlor	ND	ND	ND	ND	0.001	NA
Toxaphene	ND	ND	ND	ND	0.05	NA
Surrogate Recoveries (%)						
%SS:	108	105	107	104		
Comments						

* water samples in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak.

(a) PCB aroclor 1016; (b) PCB aroclor 1221; (c) PCB aroclor 1232; (d) PCB aroclor 1242; (e) PCB aroclor 1248; (f) PCB aroclor 1254; (g) PCB aroclor 1260; (h) a lighter than water immiscible sheen/product is present; (i) liquid sample that contains >~1 vol. % sediment; (j) sample diluted due to high organic content; (k) p,p,- is the same as 4,4,-; (l) florisil (EPA 3620) cleanup; (m) silica-gel (EPA 3630) cleanup; (n) elemental sulfur (EPA 3660) cleanup; (o) sulfuric acid permanganate (EPA 3665) cleanup; (r) results are reported on a dry weight basis; (p) see attached narrative.

DHS ELAP Certification N° 1644

AR Angela Rydelius, Lab Manager

Kleinfelder, Inc. 7133 Koll Center Pkwy, #100 Pleasanton, CA 94566	Client Project ID: #61102/PH2; Bridgehead Road & Main Street, Oakley	Date Sampled:	01/22/07-01/23/07
		Date Received:	01/23/07
	Client Contact: Jeff Salas	Date Extracted:	01/23/07
	Client P.O.:	Date Analyzed:	01/24/07-01/27/07

Organochlorine Pesticides by GC-ECD (8080 Basic Target List)*

Extraction Method: SW3550C Analytical Method: SW8081B Work Order: 0701448

Lab ID	0701448-005A	0701448-006A	0701448-007A	0701448-008A	Reporting Limit for DF =1	
Client ID	B6 B7 C6	B8 B9 C8	C10 C11 C12	C1 D1 D2		
Matrix	S	S	S	S	S	W
DF	1	1	1	1		
Compound	**Concentration**				mg/kg	µg/L
Aldrin	ND	ND	ND	ND	0.001	NA
a-BHC	ND	ND	ND	ND	0.001	NA
b-BHC	ND	ND	ND	ND	0.001	NA
d-BHC	ND	ND	ND	ND	0.001	NA
g-BHC	ND	ND	ND	ND	0.001	NA
Chlordane (Technical)	ND	ND	ND	ND	0.025	NA
a-Chlordane	ND	ND	ND	ND	0.001	NA
g-Chlordane	ND	ND	ND	ND	0.001	NA
p,p-DDD	ND	ND	ND	ND	0.001	NA
p,p-DDE	ND	0.0014	0.0021	ND	0.001	NA
p,p-DDT	ND	ND	ND	ND	0.001	NA
Dieldrin	ND	ND	ND	ND	0.001	NA
Endosulfan I	ND	ND	ND	ND	0.001	NA
Endosulfan II	ND	ND	ND	ND	0.001	NA
Endosulfan sulfate	ND	ND	ND	ND	0.001	NA
Endrin	ND	ND	ND	ND	0.001	NA
Endrin aldehyde	ND	ND	ND	ND	0.001	NA
Heptachlor	ND	ND	ND	ND	0.001	NA
Heptachlor epoxide	ND	ND	ND	ND	0.001	NA
Hexachlorobenzene	ND	ND	ND	ND	0.01	NA
Hexachlorocyclopentadiene	ND	ND	ND	ND	0.02	NA
Methoxychlor	ND	ND	ND	ND	0.001	NA
Toxaphene	ND	ND	ND	ND	0.05	NA
Surrogate Recoveries (%)						
%SS:	105	106	105	106		
Comments						

* water samples in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak.

(a) PCB aroclor 1016; (b) PCB aroclor 1221; (c) PCB aroclor 1232; (d) PCB aroclor 1242; (e) PCB aroclor 1248; (f) PCB aroclor 1254; (g) PCB aroclor 1260; (h) a lighter than water immiscible sheen/product is present; (i) liquid sample that contains >~1 vol. % sediment; (j) sample diluted due to high organic content; (k) p,p,- is the same as 4,4,-; (l) florisil (EPA 3620) cleanup; (m) silica-gel (EPA 3630) cleanup; (n) elemental sulfur (EPA 3660) cleanup; (o) sulfuric acid permanganate (EPA 3665) cleanup; (r) results are reported on a dry weight basis; (p) see attached narrative.

DHS ELAP Certification N° 1644

AR Angela Rydelius, Lab Manager

Kleinfelder, Inc. 7133 Koll Center Pkwy, #100 Pleasanton, CA 94566	Client Project ID: #61102/PH2; Bridgehead Road & Main Street, Oakley	Date Sampled:	01/22/07-01/23/07
		Date Received:	01/23/07
	Client Contact: Jeff Salas	Date Extracted:	01/23/07
	Client P.O.:	Date Analyzed:	01/24/07-01/27/07

Organochlorine Pesticides by GC-ECD (8080 Basic Target List)*

Extraction Method: SW3550C Analytical Method: SW8081B Work Order: 0701448

Lab ID	0701448-009A	0701448-010A	0701448-011A	0701448-012A	Reporting Limit for DF =1	
Client ID	C2 C3 D3	D4 D5 E4	C7 D6 D7	C9 D8 D9		
Matrix	S	S	S	S	S	W
DF	1	1	1	1		
Compound	**Concentration**				mg/kg	µg/L
Aldrin	ND	ND	ND	ND	0.001	NA
a-BHC	ND	ND	ND	ND	0.001	NA
b-BHC	ND	ND	ND	ND	0.001	NA
d-BHC	ND	ND	ND	ND	0.001	NA
g-BHC	ND	ND	ND	ND	0.001	NA
Chlordane (Technical)	ND	ND	ND	ND	0.025	NA
a-Chlordane	ND	ND	ND	ND	0.001	NA
g-Chlordane	ND	ND	ND	ND	0.001	NA
p,p-DDD	ND	ND	ND	ND	0.001	NA
p,p-DDE	ND	ND	ND	0.0066	0.001	NA
p,p-DDT	ND	ND	ND	0.0012	0.001	NA
Dieldrin	ND	ND	ND	ND	0.001	NA
Endosulfan I	ND	ND	ND	ND	0.001	NA
Endosulfan II	ND	ND	ND	ND	0.001	NA
Endosulfan sulfate	ND	ND	ND	ND	0.001	NA
Endrin	ND	ND	ND	ND	0.001	NA
Endrin aldehyde	ND	ND	ND	ND	0.001	NA
Heptachlor	ND	ND	ND	ND	0.001	NA
Heptachlor epoxide	ND	ND	ND	ND	0.001	NA
Hexachlorobenzene	ND	ND	ND	ND	0.01	NA
Hexachlorocyclopentadiene	ND	ND	ND	ND	0.02	NA
Methoxychlor	ND	ND	ND	ND	0.001	NA
Toxaphene	ND	ND	ND	ND	0.05	NA
Surrogate Recoveries (%)						
%SS:	110	106	108	108		
Comments						

* water samples in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak.

(a) PCB aroclor 1016; (b) PCB aroclor 1221; (c) PCB aroclor 1232; (d) PCB aroclor 1242; (e) PCB aroclor 1248; (f) PCB aroclor 1254; (g) PCB aroclor 1260; (h) a lighter than water immiscible sheen/product is present; (i) liquid sample that contains >~1 vol. % sediment; (j) sample diluted due to high organic content; (k) p,p,- is the same as 4,4,-; (l) florisil (EPA 3620) cleanup; (m) silica-gel (EPA 3630) cleanup; (n) elemental sulfur (EPA 3660) cleanup; (o) sulfuric acid permanganate (EPA 3665) cleanup; (r) results are reported on a dry weight basis; (p) see attached narrative.

DHS ELAP Certification N° 1644

AR Angela Rydelius, Lab Manager

Kleinfelder, Inc. 7133 Koll Center Pkwy, #100 Pleasanton, CA 94566	Client Project ID: #61102/PH2; Bridgehead Road & Main Street, Oakley	Date Sampled: 01/22/07-01/23/07 Date Received: 01/23/07
	Client Contact: Jeff Salas	Date Extracted: 01/23/07
	Client P.O.:	Date Analyzed: 01/24/07-01/27/07

Organochlorine Pesticides by GC-ECD (8080 Basic Target List)*

Extraction Method: SW3550C
Analytical Method: SW8081B
Work Order: 0701448

Lab ID	0701448-013A	0701448-014A	0701448-015A	0701448-016A	Reporting Limit for DF =1	
Client ID	D10 D11 E10	D12 E12 E13	C13 D13 D14	D15 D16 E15		
Matrix	S	S	S	S	S	W
DF	1	1	1	1		
Compound	**Concentration**				mg/kg	µg/L
Aldrin	ND	ND	ND	ND	0.001	NA
a-BHC	ND	ND	ND	ND	0.001	NA
b-BHC	ND	ND	ND	ND	0.001	NA
d-BHC	ND	ND	ND	ND	0.001	NA
g-BHC	ND	ND	ND	ND	0.001	NA
Chlordane (Technical)	ND	ND	ND	ND	0.025	NA
a-Chlordane	ND	ND	ND	ND	0.001	NA
g-Chlordane	ND	ND	ND	ND	0.001	NA
p,p-DDD	ND	ND	ND	ND	0.001	NA
p,p-DDE	0.0042	0.0038	0.0020	ND	0.001	NA
p,p-DDT	0.0013	0.0011	ND	ND	0.001	NA
Dieldrin	ND	ND	ND	ND	0.001	NA
Endosulfan I	ND	ND	ND	ND	0.001	NA
Endosulfan II	ND	ND	ND	ND	0.001	NA
Endosulfan sulfate	ND	ND	ND	ND	0.001	NA
Endrin	ND	ND	ND	ND	0.001	NA
Endrin aldehyde	ND	ND	ND	ND	0.001	NA
Heptachlor	ND	ND	ND	ND	0.001	NA
Heptachlor epoxide	ND	ND	ND	ND	0.001	NA
Hexachlorobenzene	ND	ND	ND	ND	0.01	NA
Hexachlorocyclopentadiene	ND	ND	ND	ND	0.02	NA
Methoxychlor	ND	ND	ND	ND	0.001	NA
Toxaphene	ND	ND	ND	ND	0.05	NA
Surrogate Recoveries (%)						
%SS:	106	106	107	107		
Comments						

* water samples in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak.

(a) PCB aroclor 1016; (b) PCB aroclor 1221; (c) PCB aroclor 1232; (d) PCB aroclor 1242; (e) PCB aroclor 1248; (f) PCB aroclor 1254; (g) PCB aroclor 1260; (h) a lighter than water immiscible sheen/product is present; (i) liquid sample that contains >~1 vol. % sediment; (j) sample diluted due to high organic content; (k) p,p,- is the same as 4,4,-; (l) florisil (EPA 3620) cleanup; (m) silica-gel (EPA 3630) cleanup; (n) elemental sulfur (EPA 3660) cleanup; (o) sulfuric acid permanganate (EPA 3665) cleanup; (r) results are reported on a dry weight basis; (p) see attached narrative.

AR Angela Rydelius, Lab Manager

Kleinfelder, Inc. 7133 Koll Center Pkwy, #100 Pleasanton, CA 94566	Client Project ID: #61102/PH2; Bridgehead Road & Main Street, Oakley	Date Sampled: 01/22/07-01/23/07 Date Received: 01/23/07
	Client Contact: Jeff Salas	Date Extracted: 01/23/07
	Client P.O.:	Date Analyzed: 01/24/07-01/27/07

Organochlorine Pesticides by GC-ECD (8080 Basic Target List)*

Extraction Method: SW3550C Analytical Method: SW8081B Work Order: 0701448

Lab ID	0701448-017A	0701448-018A	0701448-019A	0701448-020A	Reporting Limit for DF =1	
Client ID	E5 F4 F5	E6 F6 F7	E7 E8 F8	E9 F9 F10		
Matrix	S	S	S	S	S	W
DF	1	1	1	1		
Compound	**Concentration**				mg/kg	µg/L
Aldrin	ND	ND	ND	ND	0.001	NA
a-BHC	ND	ND	ND	ND	0.001	NA
b-BHC	ND	ND	ND	ND	0.001	NA
d-BHC	ND	ND	ND	ND	0.001	NA
g-BHC	ND	ND	ND	ND	0.001	NA
Chlordane (Technical)	ND	ND	ND	ND	0.025	NA
a-Chlordane	ND	ND	ND	ND	0.001	NA
g-Chlordane	ND	ND	ND	ND	0.001	NA
p,p-DDD	ND	ND	ND	ND	0.001	NA
p,p-DDE	ND	ND	0.0026	0.0045	0.001	NA
p,p-DDT	ND	ND	ND	0.0010	0.001	NA
Dieldrin	ND	ND	ND	ND	0.001	NA
Endosulfan I	ND	ND	ND	ND	0.001	NA
Endosulfan II	ND	ND	ND	ND	0.001	NA
Endosulfan sulfate	ND	ND	ND	ND	0.001	NA
Endrin	ND	ND	ND	ND	0.001	NA
Endrin aldehyde	ND	ND	ND	ND	0.001	NA
Heptachlor	ND	ND	ND	ND	0.001	NA
Heptachlor epoxide	ND	ND	ND	ND	0.001	NA
Hexachlorobenzene	ND	ND	ND	ND	0.01	NA
Hexachlorocyclopentadiene	ND	ND	ND	ND	0.02	NA
Methoxychlor	ND	ND	ND	ND	0.001	NA
Toxaphene	ND	ND	ND	ND	0.05	NA
Surrogate Recoveries (%)						
%SS:	107	111	105	110		
Comments						

* water samples in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak.

(a) PCB aroclor 1016; (b) PCB aroclor 1221; (c) PCB aroclor 1232; (d) PCB aroclor 1242; (e) PCB aroclor 1248; (f) PCB aroclor 1254; (g) PCB aroclor 1260; (h) a lighter than water immiscible sheen/product is present; (i) liquid sample that contains >~1 vol. % sediment; (j) sample diluted due to high organic content; (k) p,p,- is the same as 4,4,-; (l) florisil (EPA 3620) cleanup; (m) silica-gel (EPA 3630) cleanup; (n) elemental sulfur (EPA 3660) cleanup; (o) sulfuric acid permanganate (EPA 3665) cleanup; (r) results are reported on a dry weight basis; (p) see attached narrative.

AR Angela Rydelius, Lab Manager

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Kleinfelder, Inc. 7133 Koll Center Pkwy, #100 Pleasanton, CA 94566	Client Project ID: #61102/PH2; Bridgehead Road & Main Street, Oakley	Date Sampled:	01/22/07-01/23/07
		Date Received:	01/23/07
	Client Contact: Jeff Salas	Date Extracted:	01/23/07
	Client P.O.:	Date Analyzed:	01/24/07-01/27/07

Organochlorine Pesticides by GC-ECD (8080 Basic Target List)*

Extraction Method: SW3550C Analytical Method: SW8081B Work Order: 0701448

Lab ID	0701448-021A	0701448-022A	0701448-023A	0701448-024A	Reporting Limit for DF =1	
Client ID	E11 F11 F12	E14 F13 F14	E16 F15 F16	E17 E18 F17		
Matrix	S	S	S	S	S	W
DF	1	1	1	5		
Compound	**Concentration**				mg/kg	µg/L
Aldrin	ND	ND	ND	ND<0.0050	0.001	NA
a-BHC	ND	ND	ND	ND<0.0050	0.001	NA
b-BHC	ND	ND	ND	ND<0.0050	0.001	NA
d-BHC	ND	ND	ND	ND<0.0050	0.001	NA
g-BHC	ND	ND	ND	ND<0.0050	0.001	NA
Chlordane (Technical)	ND	ND	ND	ND<0.12	0.025	NA
a-Chlordane	ND	ND	ND	ND<0.0050	0.001	NA
g-Chlordane	ND	ND	ND	ND<0.0050	0.001	NA
p,p-DDD	ND	ND	ND	ND<0.0050	0.001	NA
p,p-DDE	0.0034	0.0027	ND	ND<0.0050	0.001	NA
p,p-DDT	ND	ND	ND	ND<0.0050	0.001	NA
Dieldrin	ND	ND	ND	ND<0.0050	0.001	NA
Endosulfan I	ND	ND	ND	ND<0.0050	0.001	NA
Endosulfan II	ND	ND	ND	ND<0.0050	0.001	NA
Endosulfan sulfate	ND	ND	ND	ND<0.0050	0.001	NA
Endrin	ND	ND	ND	ND<0.0050	0.001	NA
Endrin aldehyde	ND	ND	ND	ND<0.0050	0.001	NA
Heptachlor	ND	ND	ND	ND<0.0050	0.001	NA
Heptachlor epoxide	ND	ND	ND	ND<0.0050	0.001	NA
Hexachlorobenzene	ND	ND	ND	ND<0.050	0.01	NA
Hexachlorocyclopentadiene	ND	ND	ND	ND<0.10	0.02	NA
Methoxychlor	ND	ND	ND	ND<0.0050	0.001	NA
Toxaphene	ND	ND	ND	ND<0.25	0.05	NA
Surrogate Recoveries (%)						
%SS:	106	105	116	103		
Comments				j		

* water samples in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak.

(a) PCB aroclor 1016; (b) PCB aroclor 1221; (c) PCB aroclor 1232; (d) PCB aroclor 1242; (e) PCB aroclor 1248; (f) PCB aroclor 1254; (g) PCB aroclor 1260; (h) a lighter than water immiscible sheen/product is present; (i) liquid sample that contains >~1 vol. % sediment; (j) sample diluted due to high organic content; (k) p,p,- is the same as 4,4,-; (l) florisil (EPA 3620) cleanup; (m) silica-gel (EPA 3630) cleanup; (n) elemental sulfur (EPA 3660) cleanup; (o) sulfuric acid permanganate (EPA 3665) cleanup; (r) results are reported on a dry weight basis; (p) see attached narrative.

DHS ELAP Certification N° 1644

Angela Rydelius, Lab Manager

Kleinfelder, Inc. 7133 Koll Center Pkwy, #100 Pleasanton, CA 94566	Client Project ID: #61102/PH2; Bridgehead Road & Main Street, Oakley	Date Sampled: 01/22/07-01/23/07 Date Received: 01/23/07
	Client Contact: Jeff Salas	Date Extracted: 01/23/07
	Client P.O.:	Date Analyzed: 01/24/07-01/27/07

Organochlorine Pesticides by GC-ECD (8080 Basic Target List)*

Extraction Method: SW3550C Analytical Method: SW8081B Work Order: 0701448

					Reporting Limit for DF =1	
Lab ID	0701448-025A					
Client ID	F18 F19 F20					
Matrix	S				S	W
DF	1					
Compound	**Concentration**				mg/kg	µg/L
Aldrin	ND				0.001	NA
a-BHC	ND				0.001	NA
b-BHC	ND				0.001	NA
d-BHC	ND				0.001	NA
g-BHC	ND				0.001	NA
Chlordane (Technical)	ND				0.025	NA
a-Chlordane	ND				0.001	NA
g-Chlordane	ND				0.001	NA
p,p-DDD	ND				0.001	NA
p,p-DDE	0.0016				0.001	NA
p,p-DDT	ND				0.001	NA
Dieldrin	ND				0.001	NA
Endosulfan I	ND				0.001	NA
Endosulfan II	ND				0.001	NA
Endosulfan sulfate	ND				0.001	NA
Endrin	ND				0.001	NA
Endrin aldehyde	ND				0.001	NA
Heptachlor	ND				0.001	NA
Heptachlor epoxide	ND				0.001	NA
Hexachlorobenzene	ND				0.01	NA
Hexachlorocyclopentadiene	ND				0.02	NA
Methoxychlor	ND				0.001	NA
Toxaphene	ND				0.05	NA
Surrogate Recoveries (%)						
%SS:	117					
Comments						

* water samples in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak.

(a) PCB aroclor 1016; (b) PCB aroclor 1221; (c) PCB aroclor 1232; (d) PCB aroclor 1242; (e) PCB aroclor 1248; (f) PCB aroclor 1254; (g) PCB aroclor 1260; (h) a lighter than water immiscible sheen/product is present; (i) liquid sample that contains >~1 vol. % sediment; (j) sample diluted due to high organic content; (k) p,p,- is the same as 4,4,-; (l) florisil (EPA 3620) cleanup; (m) silica-gel (EPA 3630) cleanup; (n) elemental sulfur (EPA 3660) cleanup; (o) sulfuric acid permanganate (EPA 3665) cleanup; (r) results are reported on a dry weight basis; (p) see attached narrative.

DHS ELAP Certification N° 1644

AR Angela Rydelius, Lab Manager

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Kleinfelder, Inc. 7133 Koll Center Pkwy, #100 Pleasanton, CA 94566	Client Project ID: #61102/PH2; Bridgehead Road & Main Street, Oakley	Date Sampled: 01/22/07-01/23/07
		Date Received: 01/23/07
	Client Contact: Jeff Salas	Date Extracted: 01/23/07
	Client P.O.:	Date Analyzed 01/25/07-01/29/07

As, Pb, and Hg by ICP-MS*

Extraction method SW3050B Analytical methods 6020A Work Order: 0701448

Lab ID	Client ID	Matrix	Extraction	Arsenic	Lead	Mercury	DF	% SS
001A	A1 A2 B1	S	TTLC	2.6	13	ND	1	102
002A	A3 B2 B3	S	TTLC	3.1	12	ND	1	99
003A	A4 A5 B4	S	TTLC	5.0	11	ND	1	102
004A	B5 C4 C5	S	TTLC	2.1	8.8	ND	1	99
005A	B6 B7 C6	S	TTLC	2.2	8.5	0.053	1	96
006A	B8 B9 C8	S	TTLC	2.4	8.5	ND	1	97
007A	C10 C11 C12	S	TTLC	2.2	9.9	ND	1	103
008A	C1 D1 D2	S	TTLC	2.3	13	ND	1	97
009A	C2 C3 D3	S	TTLC	2.5	10	ND	1	101
010A	D4 D5 E4	S	TTLC	2.4	11	ND	1	104
011A	C7 D6 D7	S	TTLC	1.9	6.3	ND	1	103
012A	C9 D8 D9	S	TTLC	2.0	9.4	ND	1	102
013A	D10 D11 E10	S	TTLC	2.5	11	ND	1	102
014A	D12 E12 E13	S	TTLC	2.4	11	ND	1	102
015A	C13 D13 D14	S	TTLC	2.4	14	ND	1	105
016A	D15 D16 E15	S	TTLC	4.0	8.4	ND	1	99

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	W	TTLC	NA	NA	NA	NA
	S	TTLC	0.5	0.5	0.05	mg/Kg

*water samples are reported in µg/L, product/oil/non-aqueous liquid samples and all TCLP / STLC / DISTLC / SPLP extracts are reported in mg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter.

means surrogate diluted out of range; ND means not detected above the reporting limit; N/A means not applicable to this sample or instrument.

i) aqueous sample containing greater than ~1 vol. % sediment; for DISSOLVED metals, this sample has been preserved prior to filtration; for TTLC metals, a representative sediment-water mixture was digested; j) reporting limit raised due to insufficient sample amount; k) reporting limit raised due to matrix interference; m) estimated value due to low/high surrogate recovery, caused by matrix interference; n) results are reported on a dry weight basis; p) see attached narrative.

DHS ELAP Certification N° 1644

AR Angela Rydelius, Lab Manager

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Kleinfelder, Inc. 7133 Koll Center Pkwy, #100 Pleasanton, CA 94566	Client Project ID: #61102/PH2; Bridgehead Road & Main Street, Oakley	Date Sampled: 01/22/07-01/23/07
		Date Received: 01/23/07
	Client Contact: Jeff Salas	Date Extracted: 01/23/07
	Client P.O.:	Date Analyzed 01/25/07-01/29/07

As, Pb, and Hg by ICP-MS*

Extraction method SW3050B Analytical methods 6020A Work Order: 0701448

Lab ID	Client ID	Matrix	Extraction	Arsenic	Lead	Mercury	DF	% SS
017A	E5 F4 F5	S	TTLC	2.4	21	ND	1	105
018A	E6 F6 F7	S	TTLC	2.2	7.5	ND	1	106
019A	E7 E8 F8	S	TTLC	2.0	8.6	ND	1	99
020A	E9 F9 F10	S	TTLC	2.0	11	ND	1	103
021A	E11 F11 F12	S	TTLC	2.6	13	ND	1	101
022A	E14 F13 F14	S	TTLC	2.0	14	ND	1	102
023A	E16 F15 F16	S	TTLC	2.3	8.0	ND	1	102
024A	E17 E18 F17	S	TTLC	2.3	13	ND	1	103
025A	F18 F19 F20	S	TTLC	2.2	14	ND	1	101

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	W	TTLC	NA	NA	NA	NA
	S	TTLC	0.5	0.5	0.05	mg/Kg

*water samples are reported in µg/L, product/oil/non-aqueous liquid samples and all TCLP / STLC / DISTLC / SPLP extracts are reported in mg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter.

means surrogate diluted out of range; ND means not detected above the reporting limit; N/A means not applicable to this sample or instrument.

i) aqueous sample containing greater than ~1 vol. % sediment; for DISSOLVED metals, this sample has been preserved prior to filtration; for TTLC metals, a representative sediment-water mixture was digested; j) reporting limit raised due to insufficient sample amount; k) reporting limit raised due to matrix interference; m) estimated value due to low/high surrogate recovery, caused by matrix interference; n) results are reported on a dry weight basis; p) see attached narrative.

DHS ELAP Certification N° 1644

Angela Rydelius, Lab Manager

QC SUMMARY REPORT FOR SW8081B

W.O. Sample Matrix: Soil QC Matrix: Soil WorkOrder: 0701448

EPA Method: SW8081B **Extraction: SW3550C** **BatchID: 25848** **Spiked Sample ID: 0701417-001A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)			
	mg/kg	mg/kg	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	RPD	LCS/LCSD	RPD
Aldrin	ND<0.020	0.010	NR	NR	NR	107	106	0.133	70 - 130	30	70 - 130	30
g-BHC	ND<0.020	0.010	NR	NR	NR	89.6	89.3	0.284	70 - 130	30	70 - 130	30
p,p-DDT	ND<0.020	0.025	NR	NR	NR	81.5	80.7	0.918	70 - 130	30	70 - 130	30
Dieldrin	ND<0.020	0.025	NR	NR	NR	105	104	0.186	70 - 130	30	70 - 130	30
Endrin	ND<0.020	0.025	NR	NR	NR	106	106	0	70 - 130	30	70 - 130	30
Heptachlor	ND<0.020	0.010	NR	NR	NR	90.7	90.5	0.245	70 - 130	30	70 - 130	30
%SS:	85	0.050	97	92	4.83	113	112	0.753	70 - 130	30	70 - 130	30

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 25848 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0701448-001A	1/22/07 1:47 PM	1/23/07	1/24/07 6:56 PM	0701448-002A	1/22/07 1:20 PM	1/23/07	1/24/07 7:55 PM
0701448-003A	1/22/07 11:46 AM	1/23/07	1/24/07 8:54 PM	0701448-004A	1/22/07 11:39 AM	1/23/07	1/24/07 9:52 PM
0701448-005A	1/22/07 10:12 AM	1/23/07	1/24/07 10:49 PM	0701448-006A	1/22/07 8:30 AM	1/23/07	1/25/07 12:43 AM
0701448-007A	1/23/07 8:37 AM	1/23/07	1/25/07 1:40 AM	0701448-008A	1/22/07 1:37 PM	1/23/07	1/25/07 2:36 AM
0701448-009A	1/22/07 1:30 PM	1/23/07	1/25/07 3:32 AM	0701448-010A	1/22/07 11:36 AM	1/23/07	1/25/07 4:28 AM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2)

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND cont significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS ELAP Certification N° 1644

SH QA/QC Officer

QC SUMMARY REPORT FOR SW8081B

W.O. Sample Matrix: Soil QC Matrix: Soil WorkOrder: 0701448

EPA Method: SW8081B **Extraction: SW3550C** **BatchID: 25880** **Spiked Sample ID: 0701448-025A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)			
	mg/kg	mg/kg	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	RPD	LCS/LCSD	RPD
Aldrin	ND	0.010	110	110	0	116	118	2.19	70 - 130	30	70 - 130	30
g-BHC	ND	0.010	93.9	93.9	0	87.6	89.5	2.16	70 - 130	30	70 - 130	30
p,p-DDT	ND	0.025	95	94.3	0.692	89.5	90.3	0.943	70 - 130	30	70 - 130	30
Dieldrin	ND	0.025	113	112	0.410	104	106	1.70	70 - 130	30	70 - 130	30
Endrin	ND	0.025	116	115	0.570	104	105	0.553	70 - 130	30	70 - 130	30
Heptachlor	ND	0.010	94.8	94.6	0.281	80.8	82.5	2.05	70 - 130	30	70 - 130	30
%SS:	117	0.050	116	127	0.201	105	103	1.95	70 - 130	30	70 - 130	30

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 25880 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0701448-011A	1/22/07 10:10 AM	1/23/07	1/25/07 8:13 AM	0701448-012A	1/22/07 10:38 AM	1/23/07	1/25/07 9:10 AM
0701448-013A	1/23/07 8:42 AM	1/23/07	1/25/07 10:08 AM	0701448-014A	1/23/07 9:27 AM	1/23/07	1/25/07 11:06 AM
0701448-015A	1/23/07 10:02 AM	1/23/07	1/25/07 12:05 PM	0701448-016A	1/23/07 10:35 AM	1/23/07	1/25/07 2:04 PM
0701448-017A	1/22/07 11:30 AM	1/23/07	1/25/07 3:03 PM	0701448-018A	1/22/07 9:42 AM	1/23/07	1/25/07 4:03 PM
0701448-019A	1/22/07 10:30 AM	1/23/07	1/25/07 5:02 PM	0701448-020A	1/23/07 8:21 AM	1/23/07	1/25/07 6:01 PM
0701448-021A	1/23/07 9:03 AM	1/23/07	1/24/07 11:26 PM	0701448-022A	1/23/07 9:56 AM	1/23/07	1/25/07 12:21 AM
0701448-023A	1/23/07 10:30 AM	1/23/07	1/25/07 1:15 AM	0701448-024A	1/23/07 10:56 AM	1/23/07	1/27/07 5:31 PM
0701448-025A	1/23/07 11:04 AM	1/23/07	1/25/07 3:04 AM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND cont significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS ELAP Certification N° 1644

QA/QC Officer

QC SUMMARY REPORT FOR 6020A

W.O. Sample Matrix: Soil QC Matrix: Soil WorkOrder 0701448

EPA Method 6020A **Extraction SW3050B** **BatchID: 25870** **Spiked Sample ID 0701408-010D**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	Spiked	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)			
	mg/Kg	mg/Kg	% Rec.	% Rec.	% RPD	mg/Kg	% Rec.	% Rec.	% RPD	MS / MSD	RPD	LCS/LCSD	RPD
Arsenic	2.4	50	99.8	97.6	2.14	10	95.1	95.3	0.200	75 - 125	20	80 - 120	20
Lead	6.2	50	98.3	97.6	0.670	10	95.4	94.1	1.37	75 - 125	20	80 - 120	20
Mercury	ND	2.5	103	103	0	0.50	96.6	96.8	0.222	75 - 125	20	80 - 120	20
%SS:	103	250	103	104	0.888	250	100	99	1.53	70 - 130	20	70 - 130	20

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 25870 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0701448-001A	1/22/07 1:47 PM	1/23/07	1/25/07 8:31 PM	0701448-002A	1/22/07 1:20 PM	1/23/07	1/25/07 9:02 PM
0701448-003A	1/22/07 11:46 AM	1/23/07	1/25/07 9:12 PM	0701448-004A	1/22/07 11:39 AM	1/23/07	1/25/07 9:30 PM
0701448-005A	1/22/07 10:12 AM	1/23/07	1/29/07 3:15 PM	0701448-006A	1/22/07 8:30 AM	1/23/07	1/25/07 9:53 PM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not applicable to this method.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte

DHS ELAP Certification N° 1644

QA/QC Officer

McCampbell Analytical, Inc.
"When Quality Counts"

1534 Willow Pass Road, Pittsburg, CA 94565-1701
Web: www.mccampbell.com E-mail: main@mccampbell.com
Telephone: 877-252-9262 Fax: 925-252-9269

QC SUMMARY REPORT FOR 6020A

W.O. Sample Matrix: Soil QC Matrix: Soil WorkOrder 0701448

EPA Method 6020A **Extraction SW3050B** **BatchID: 25881** **Spiked Sample ID 0701448-025A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	Spiked	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)			
	mg/Kg	mg/Kg	% Rec.	% Rec.	% RPD	mg/Kg	% Rec.	% Rec.	% RPD	MS / MSD	RPD	LCS/LCSD	RPD
Arsenic	2.2	50	98.7	100	1.23	10	95.8	95.4	0.398	75 - 125	20	80 - 120	20
Lead	14	50	96.9	97.5	0.449	10	97.8	97.8	0	75 - 125	20	80 - 120	20
Mercury	ND	2.5	98.8	99.8	0.995	0.50	93.8	94.6	0.793	75 - 125	20	80 - 120	20
%SS:	101	250	101	100	0.199	250	97	97	0	70 - 130	20	70 - 130	20

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 25881 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0701448-007A	1/23/07 8:37 AM	1/23/07	1/25/07 9:59 PM	0701448-008A	1/22/07 1:37 PM	1/23/07	1/25/07 10:05 PM
0701448-009A	1/22/07 1:30 PM	1/23/07	1/25/07 10:11 PM	0701448-010A	1/22/07 11:36 AM	1/23/07	1/25/07 10:17 PM
0701448-011A	1/22/07 10:10 AM	1/23/07	1/25/07 10:49 PM	0701448-012A	1/22/07 10:38 AM	1/23/07	1/25/07 10:55 PM
0701448-013A	1/23/07 8:42 AM	1/23/07	1/25/07 11:01 PM	0701448-014A	1/23/07 9:27 AM	1/23/07	1/25/07 11:07 PM
0701448-015A	1/23/07 10:02 AM	1/23/07	1/25/07 11:13 PM	0701448-016A	1/23/07 10:35 AM	1/23/07	1/25/07 11:19 PM
0701448-017A	1/22/07 11:30 AM	1/23/07	1/25/07 11:25 PM	0701448-018A	1/22/07 9:42 AM	1/23/07	1/25/07 11:32 PM
0701448-019A	1/22/07 10:30 AM	1/23/07	1/25/07 11:38 PM	0701448-020A	1/23/07 8:21 AM	1/23/07	1/25/07 11:44 PM
0701448-021A	1/23/07 9:03 AM	1/23/07	1/26/07 12:15 AM	0701448-022A	1/23/07 9:56 AM	1/23/07	1/26/07 12:21 AM
0701448-023A	1/23/07 10:30 AM	1/23/07	1/26/07 12:27 AM	0701448-024A	1/23/07 10:56 AM	1/23/07	1/26/07 12:33 AM
0701448-025A	1/23/07 11:04 AM	1/23/07	1/25/07 7:35 PM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not applicable to this method.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte

DHS ELAP Certification N° 1644

QA/QC Officer

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Telephone: 877-252-9262 Fax: 925-252-9269

Kleinfelder, Inc. 7133 Koll Center Pkwy, #100 Pleasanton, CA 94566	Client Project ID: Palland	Date Sampled: 01/29/07
		Date Received: 01/29/07
	Client Contact: Jim Lehrman	Date Reported: 02/01/07
	Client P.O.:	Date Completed: 02/01/07

WorkOrder: 0701565

February 01, 2007

Dear Jim:

Enclosed are:

1). the results of 6 analyzed samples from your **Palland project,**

2). a QC report for the above samples

3). a copy of the chain of custody, and

4). a bill for analytical services.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits. If you have any questions please contact me. McCampbell Analytical Laboratories strives for excellence in quality, service and cost. Thank you for your business and I look forward to working with you again.

Best regards,

Angela Rydelius, Lab Manager

KLEINFELDER

PROJECT NO.	PROJECT NAME	RECEIVING LAB:
	PALLAND	McCAMPBELL
L.P. NO. (P.O. NO.)	SAMPLERS: (Signature/Number) J WILLIAMS	INSTRUCTIONS/REMARKS: STANDARD TAT *INCLUDE FUEL OXYS

	DATE MM/DD/YY	SAMPLE I.D. TIME HH-MM-SS	SAMPLE I.D.	MATRIX	NO. OF CON-TAINERS	TYPE OF CON-TAINERS	ANALYSIS: VOCs (8260B)*	TPHg (8015m)	TPHd,o (8015m)	CAM 17 METALS (6010)	INSTRUCTIONS/REMARKS
1	1/24/07	1004	B-1-4'	SOIL	1	TUBE	X	X	X	X	
2	1/24/07	0842	B-2-4'	SOIL	1	TUBE	✓	X	X	X	
3	1/24/07	0755	B-3-4'	SOIL	1	TUBE	X	X	X	X	
130 4	1/24/07	1040	B-1	WATER	5	VOA/AL	X	X	X		
180 5	1/24/07	0910	B-2	WATER	5	VOA/AL	X	X	X		
145 6	1/24/07	0925	B-3	WATER	5	VOA/AL	X	X	X		
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											

ICE/t° ✓
GOOD CONDITION ✓ APPROPRIATE CONTAINERS ✓
HEAD SPACE ABSENT ✓
DECHLORINATED IN LAB ___ PRESERVED IN LAB ___
VOAS | O&G | METALS | OTHER
PRESERVATION ✓

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Instructions/Remarks:	Send Results To:
	1/24/07 1205	Mil Vall	EMAIL RESULTS TO: JLehrman@kleinfelder.com MHopkins@kleinfelder.com	KLEINFELDER 7133 KOLL CENTER PARKWAY SUITE 100 PLEASANTON, CA 94566 (925) 484-1700
Relinquished by: (Signature)	Date/Time	Received by: (Signature)		
Relinquished by: (Signature)	Date/Time	Received for Laboratory by: (Signature)		Attn: JIM LEHRMAN

M-60 White – Sampler Canary – Return Copy To Shipper Pink – Lab Copy

CHAIN OF CUSTODY

№ 4247

McCampbell Analytical, Inc.
1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

WorkOrder: 0701565 **ClientID: KFP**

☐EDF ☐Fax ☑Email ☐HardCopy ☐ThirdParty

Report to:
Jim Lehrman
Kleinfelder, Inc.
7133 Koll Center Pkwy, #100
Pleasanton, CA 94566

Email: jlehrman@kleinfelder.com
TEL: (925) 484-1700 FAX: (925) 484-5838
ProjectNo: Palland
PO:

Bill to:
Accounts Payable
Kleinfelder Inc.
7133 Koll Center Pkwy, #100
Pleasanton, CA 94566

Requested TAT: **5 days**

Date Received: 01/29/2007
Date Printed: 01/29/2007

					Requested Tests (See legend below)											
Sample ID	**ClientSampID**	**Matrix**	**Collection Date**	**Hold**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
0701565-001	B-1-4'	Soil	1/29/07 10:04:00	☐	A		A	A								
0701565-002	B-2-4'	Soil	1/29/07 8:42:00 AM	☐	A		A	A								
0701565-003	B-3-4'	Soil	1/29/07 7:55:00 AM	☐	A		A	A								
0701565-004	B-1	Water	1/29/07 10:40:00	☐		B			A							
0701565-005	B-2	Water	1/29/07 9:10:00 AM	☐		B			A							
0701565-006	B-3	Water	1/29/07 9:25:00 AM	☐		B			A							

Test Legend:

1	8260B_S	2	8260B_W	3	CAM17MS_S	4	G-MBTEX_S	5	G-MBTEX_W
6		7		8		9		10	
11		12							

The following SampIDs: 0701565-001A, 0701565-002A, 0701565-003A, 0701565-004A, 0701565-005A, 0701565-006A contain testgroup.
Please make sure all relevant testcodes are reported. Many thanks.

Prepared by: Melissa Valles

Comments: Please CC: mhopkins@kleinfelder.com

NOTE: Samples are discarded 60 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

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"When Quality Counts"

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Telephone: 877-252-9262 Fax: 925-252-9269

Kleinfelder, Inc. 7133 Koll Center Pkwy, #100 Pleasanton, CA 94566	Client Project ID: Palland	Date Sampled: 01/29/07 Date Received: 01/29/07
	Client Contact: Jim Lehrman	Date Extracted: 01/29/07
	Client P.O.:	Date Analyzed 01/30/07

Volatile Organics by P&T and GC/MS (Basic Target List)*

Extraction Method: SW5030B Analytical Method: SW8260B Work Order: 0701565

Lab ID	0701565-001A
Client ID	B-1-4'
Matrix	Soil

Compound	Concentration *	DF	Reporting Limit	Compound	Concentration *	DF	Reporting Limit
Acetone	ND	1.0	0.05	Acrolein (Propenal)	ND	1.0	0.05
Acrylonitrile	ND	1.0	0.02	tert-Amyl methyl ether (TAME)	ND	1.0	0.005
Benzene	ND	1.0	0.005	Bromobenzene	ND	1.0	0.005
Bromochloromethane	ND	1.0	0.005	Bromodichloromethane	ND	1.0	0.005
Bromoform	ND	1.0	0.005	Bromomethane	ND	1.0	0.005
2-Butanone (MEK)	ND	1.0	0.02	t-Butyl alcohol (TBA)	ND	1.0	0.05
n-Butyl benzene	ND	1.0	0.005	sec-Butyl benzene	ND	1.0	0.005
tert-Butyl benzene	ND	1.0	0.005	Carbon Disulfide	ND	1.0	0.005
Carbon Tetrachloride	ND	1.0	0.005	Chlorobenzene	ND	1.0	0.005
Chloroethane	ND	1.0	0.005	2-Chloroethyl Vinyl Ether	ND	1.0	0.01
Chloroform	ND	1.0	0.005	Chloromethane	ND	1.0	0.005
2-Chlorotoluene	ND	1.0	0.005	4-Chlorotoluene	ND	1.0	0.005
Dibromochloromethane	ND	1.0	0.005	1,2-Dibromo-3-chloropropane	ND	1.0	0.005
1,2-Dibromoethane (EDB)	ND	1.0	0.005	Dibromomethane	ND	1.0	0.005
1,2-Dichlorobenzene	ND	1.0	0.005	1,3-Dichlorobenzene	ND	1.0	0.005
1,4-Dichlorobenzene	ND	1.0	0.005	Dichlorodifluoromethane	ND	1.0	0.005
1,1-Dichloroethane	ND	1.0	0.005	1,2-Dichloroethane (1,2-DCA)	ND	1.0	0.005
1,1-Dichloroethene	ND	1.0	0.005	cis-1,2-Dichloroethene	ND	1.0	0.005
trans-1,2-Dichloroethene	ND	1.0	0.005	1,2-Dichloropropane	ND	1.0	0.005
1,3-Dichloropropane	ND	1.0	0.005	2,2-Dichloropropane	ND	1.0	0.005
1,1-Dichloropropene	ND	1.0	0.005	cis-1,3-Dichloropropene	ND	1.0	0.005
trans-1,3-Dichloropropene	ND	1.0	0.005	Diisopropyl ether (DIPE)	ND	1.0	0.005
Ethylbenzene	ND	1.0	0.005	Ethyl tert-butyl ether (ETBE)	ND	1.0	0.005
Freon 113	ND	1.0	0.1	Hexachlorobutadiene	ND	1.0	0.005
Hexachloroethane	ND	1.0	0.005	2-Hexanone	ND	1.0	0.005
Isopropylbenzene	ND	1.0	0.005	4-Isopropyl toluene	ND	1.0	0.005
Methyl-t-butyl ether (MTBE)	ND	1.0	0.005	Methylene chloride	ND	1.0	0.005
4-Methyl-2-pentanone (MIBK)	ND	1.0	0.005	Naphthalene	ND	1.0	0.005
Nitrobenzene	ND	1.0	0.1	n-Propyl benzene	ND	1.0	0.005
Styrene	ND	1.0	0.005	1,1,1,2-Tetrachloroethane	ND	1.0	0.005
1,1,2,2-Tetrachloroethane	ND	1.0	0.005	Tetrachloroethene	ND	1.0	0.005
Toluene	ND	1.0	0.005	1,2,3-Trichlorobenzene	ND	1.0	0.005
1,2,4-Trichlorobenzene	ND	1.0	0.005	1,1,1-Trichloroethane	ND	1.0	0.005
1,1,2-Trichloroethane	ND	1.0	0.005	Trichloroethene	ND	1.0	0.005
Trichlorofluoromethane	ND	1.0	0.005	1,2,3-Trichloropropane	ND	1.0	0.005
1,2,4-Trimethylbenzene	ND	1.0	0.005	1,3,5-Trimethylbenzene	ND	1.0	0.005
Vinyl Chloride	ND	1.0	0.005	Xylenes	ND	1.0	0.005

Surrogate Recoveries (%)

%SS1:	97	%SS2:	92
%SS3:	93		

Comments:

* water and vapor samples are reported in µg/L, soil/sludge/solid samples in mg/kg, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L, wipe samples in µg/wipe.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or coelutes with another peak; &) low surrogate due to matrix interference.

h) lighter than water immiscible sheen/product is present; i) liquid sample that contains greater than ~1 vol. % sediment; j) sample diluted due to high organic content/matrix interference; k) reporting limit near, but not identical to our standard reporting limit due to variable Encore sample weight; m) reporting limit raised due to insufficient sample amount; n) results are reported on a dry weight basis; p) see attached narrative.

DHS ELAP Certification N° 1644

AR Angela Rydelius, Lab Manager

Kleinfelder, Inc. 7133 Koll Center Pkwy, #100 Pleasanton, CA 94566	Client Project ID: Palland	Date Sampled: 01/29/07
		Date Received: 01/29/07
	Client Contact: Jim Lehrman	Date Extracted: 01/29/07
	Client P.O.:	Date Analyzed 01/30/07

Volatile Organics by P&T and GC/MS (Basic Target List)*

Extraction Method: SW5030B Analytical Method: SW8260B Work Order: 0701565

Lab ID	0701565-002A
Client ID	B-2-4'
Matrix	Soil

Compound	Concentration *	DF	Reporting Limit	Compound	Concentration *	DF	Reporting Limit
Acetone	ND	1.0	0.05	Acrolein (Propenal)	ND	1.0	0.05
Acrylonitrile	ND	1.0	0.02	tert-Amyl methyl ether (TAME)	ND	1.0	0.005
Benzene	ND	1.0	0.005	Bromobenzene	ND	1.0	0.005
Bromochloromethane	ND	1.0	0.005	Bromodichloromethane	ND	1.0	0.005
Bromoform	ND	1.0	0.005	Bromomethane	ND	1.0	0.005
2-Butanone (MEK)	ND	1.0	0.02	t-Butyl alcohol (TBA)	ND	1.0	0.05
n-Butyl benzene	ND	1.0	0.005	sec-Butyl benzene	ND	1.0	0.005
tert-Butyl benzene	ND	1.0	0.005	Carbon Disulfide	ND	1.0	0.005
Carbon Tetrachloride	ND	1.0	0.005	Chlorobenzene	ND	1.0	0.005
Chloroethane	ND	1.0	0.005	2-Chloroethyl Vinyl Ether	ND	1.0	0.01
Chloroform	ND	1.0	0.005	Chloromethane	ND	1.0	0.005
2-Chlorotoluene	ND	1.0	0.005	4-Chlorotoluene	ND	1.0	0.005
Dibromochloromethane	ND	1.0	0.005	1,2-Dibromo-3-chloropropane	ND	1.0	0.005
1,2-Dibromoethane (EDB)	ND	1.0	0.005	Dibromomethane	ND	1.0	0.005
1,2-Dichlorobenzene	ND	1.0	0.005	1,3-Dichlorobenzene	ND	1.0	0.005
1,4-Dichlorobenzene	ND	1.0	0.005	Dichlorodifluoromethane	ND	1.0	0.005
1,1-Dichloroethane	ND	1.0	0.005	1,2-Dichloroethane (1,2-DCA)	ND	1.0	0.005
1,1-Dichloroethene	ND	1.0	0.005	cis-1,2-Dichloroethene	ND	1.0	0.005
trans-1,2-Dichloroethene	ND	1.0	0.005	1,2-Dichloropropane	ND	1.0	0.005
1,3-Dichloropropane	ND	1.0	0.005	2,2-Dichloropropane	ND	1.0	0.005
1,1-Dichloropropene	ND	1.0	0.005	cis-1,3-Dichloropropene	ND	1.0	0.005
trans-1,3-Dichloropropene	ND	1.0	0.005	Diisopropyl ether (DIPE)	ND	1.0	0.005
Ethylbenzene	ND	1.0	0.005	Ethyl tert-butyl ether (ETBE)	ND	1.0	0.005
Freon 113	ND	1.0	0.1	Hexachlorobutadiene	ND	1.0	0.005
Hexachloroethane	ND	1.0	0.005	2-Hexanone	ND	1.0	0.005
Isopropylbenzene	ND	1.0	0.005	4-Isopropyl toluene	ND	1.0	0.005
Methyl-t-butyl ether (MTBE)	ND	1.0	0.005	Methylene chloride	ND	1.0	0.005
4-Methyl-2-pentanone (MIBK)	ND	1.0	0.005	Naphthalene	ND	1.0	0.005
Nitrobenzene	ND	1.0	0.1	n-Propyl benzene	ND	1.0	0.005
Styrene	ND	1.0	0.005	1,1,1,2-Tetrachloroethane	ND	1.0	0.005
1,1,2,2-Tetrachloroethane	ND	1.0	0.005	Tetrachloroethene	ND	1.0	0.005
Toluene	ND	1.0	0.005	1,2,3-Trichlorobenzene	ND	1.0	0.005
1,2,4-Trichlorobenzene	ND	1.0	0.005	1,1,1-Trichloroethane	ND	1.0	0.005
1,1,2-Trichloroethane	ND	1.0	0.005	Trichloroethene	ND	1.0	0.005
Trichlorofluoromethane	ND	1.0	0.005	1,2,3-Trichloropropane	ND	1.0	0.005
1,2,4-Trimethylbenzene	ND	1.0	0.005	1,3,5-Trimethylbenzene	ND	1.0	0.005
Vinyl Chloride	ND	1.0	0.005	Xylenes	ND	1.0	0.005

Surrogate Recoveries (%)

%SS1:	97	%SS2:	91
%SS3:	92		

Comments:

* water and vapor samples are reported in µg/L, soil/sludge/solid samples in mg/kg, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L, wipe samples in µg/wipe.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or coelutes with another peak; &) low surrogate due to matrix interference.

h) lighter than water immiscible sheen/product is present; i) liquid sample that contains greater than ~1 vol. % sediment; j) sample diluted due to high organic content/matrix interference; k) reporting limit near, but not identical to our standard reporting limit due to variable Encore sample weight; m) reporting limit raised due to insufficient sample amount; n) results are reported on a dry weight basis; p) see attached narrative.

DHS ELAP Certification N° 1644

AR Angela Rydelius, Lab Manager

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Kleinfelder, Inc. 7133 Koll Center Pkwy, #100 Pleasanton, CA 94566	Client Project ID: Palland	Date Sampled: 01/29/07
		Date Received: 01/29/07
	Client Contact: Jim Lehrman	Date Extracted: 01/29/07
	Client P.O.:	Date Analyzed 01/30/07

Volatile Organics by P&T and GC/MS (Basic Target List)*

Extraction Method: SW5030B Analytical Method: SW8260B Work Order: 0701565

Lab ID	0701565-003A
Client ID	B-3-4'
Matrix	Soil

Compound	Concentration *	DF	Reporting Limit	Compound	Concentration *	DF	Reporting Limit
Acetone	ND	1.0	0.05	Acrolein (Propenal)	ND	1.0	0.05
Acrylonitrile	ND	1.0	0.02	tert-Amyl methyl ether (TAME)	ND	1.0	0.005
Benzene	ND	1.0	0.005	Bromobenzene	ND	1.0	0.005
Bromochloromethane	ND	1.0	0.005	Bromodichloromethane	ND	1.0	0.005
Bromoform	ND	1.0	0.005	Bromomethane	ND	1.0	0.005
2-Butanone (MEK)	ND	1.0	0.02	t-Butyl alcohol (TBA)	ND	1.0	0.05
n-Butyl benzene	ND	1.0	0.005	sec-Butyl benzene	ND	1.0	0.005
tert-Butyl benzene	ND	1.0	0.005	Carbon Disulfide	ND	1.0	0.005
Carbon Tetrachloride	ND	1.0	0.005	Chlorobenzene	ND	1.0	0.005
Chloroethane	ND	1.0	0.005	2-Chloroethyl Vinyl Ether	ND	1.0	0.01
Chloroform	ND	1.0	0.005	Chloromethane	ND	1.0	0.005
2-Chlorotoluene	ND	1.0	0.005	4-Chlorotoluene	ND	1.0	0.005
Dibromochloromethane	ND	1.0	0.005	1,2-Dibromo-3-chloropropane	ND	1.0	0.005
1,2-Dibromoethane (EDB)	ND	1.0	0.005	Dibromomethane	ND	1.0	0.005
1,2-Dichlorobenzene	ND	1.0	0.005	1,3-Dichlorobenzene	ND	1.0	0.005
1,4-Dichlorobenzene	ND	1.0	0.005	Dichlorodifluoromethane	ND	1.0	0.005
1,1-Dichloroethane	ND	1.0	0.005	1,2-Dichloroethane (1,2-DCA)	ND	1.0	0.005
1,1-Dichloroethene	ND	1.0	0.005	cis-1,2-Dichloroethene	ND	1.0	0.005
trans-1,2-Dichloroethene	ND	1.0	0.005	1,2-Dichloropropane	ND	1.0	0.005
1,3-Dichloropropane	ND	1.0	0.005	2,2-Dichloropropane	ND	1.0	0.005
1,1-Dichloropropene	ND	1.0	0.005	cis-1,3-Dichloropropene	ND	1.0	0.005
trans-1,3-Dichloropropene	ND	1.0	0.005	Diisopropyl ether (DIPE)	ND	1.0	0.005
Ethylbenzene	ND	1.0	0.005	Ethyl tert-butyl ether (ETBE)	ND	1.0	0.005
Freon 113	ND	1.0	0.1	Hexachlorobutadiene	ND	1.0	0.005
Hexachloroethane	ND	1.0	0.005	2-Hexanone	ND	1.0	0.005
Isopropylbenzene	ND	1.0	0.005	4-Isopropyl toluene	ND	1.0	0.005
Methyl-t-butyl ether (MTBE)	ND	1.0	0.005	Methylene chloride	ND	1.0	0.005
4-Methyl-2-pentanone (MIBK)	ND	1.0	0.005	Naphthalene	ND	1.0	0.005
Nitrobenzene	ND	1.0	0.1	n-Propyl benzene	ND	1.0	0.005
Styrene	ND	1.0	0.005	1,1,1,2-Tetrachloroethane	ND	1.0	0.005
1,1,2,2-Tetrachloroethane	ND	1.0	0.005	Tetrachloroethene	ND	1.0	0.005
Toluene	ND	1.0	0.005	1,2,3-Trichlorobenzene	ND	1.0	0.005
1,2,4-Trichlorobenzene	ND	1.0	0.005	1,1,1-Trichloroethane	ND	1.0	0.005
1,1,2-Trichloroethane	ND	1.0	0.005	Trichloroethene	ND	1.0	0.005
Trichlorofluoromethane	ND	1.0	0.005	1,2,3-Trichloropropane	ND	1.0	0.005
1,2,4-Trimethylbenzene	ND	1.0	0.005	1,3,5-Trimethylbenzene	ND	1.0	0.005
Vinyl Chloride	ND	1.0	0.005	Xylenes	ND	1.0	0.005

Surrogate Recoveries (%)

%SS1:	96	%SS2:	93
%SS3:	92		

Comments:

* water and vapor samples are reported in µg/L, soil/sludge/solid samples in mg/kg, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L, wipe samples in µg/wipe.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or coelutes with another peak; &) low surrogate due to matrix interference.

h) lighter than water immiscible sheen/product is present; i) liquid sample that contains greater than ~1 vol. % sediment; j) sample diluted due to high organic content/matrix interference; k) reporting limit near, but not identical to our standard reporting limit due to variable Encore sample weight; m) reporting limit raised due to insufficient sample amount; n) results are reported on a dry weight basis; p) see attached narrative.

DHS ELAP Certification N° 1644

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Kleinfelder, Inc. 7133 Koll Center Pkwy, #100 Pleasanton, CA 94566	Client Project ID: Palland	Date Sampled: 01/29/07
		Date Received: 01/29/07
	Client Contact: Jim Lehrman	Date Extracted: 01/30/07
	Client P.O.:	Date Analyzed 01/30/07

Volatile Organics by P&T and GC/MS (Basic Target List)*

Extraction Method: SW5030B Analytical Method: SW8260B Work Order: 0701565

Lab ID	0701565-004B
Client ID	B-1
Matrix	Water

Compound	Concentration *	DF	Reporting Limit	Compound	Concentration *	DF	Reporting Limit
Acetone	ND	1.0	10	Acrolein (Propenal)	ND	1.0	5.0
Acrylonitrile	ND	1.0	2.0	tert-Amyl methyl ether (TAME)	ND	1.0	0.5
Benzene	ND	1.0	0.5	Bromobenzene	ND	1.0	0.5
Bromochloromethane	ND	1.0	0.5	Bromodichloromethane	ND	1.0	0.5
Bromoform	ND	1.0	0.5	Bromomethane	ND	1.0	0.5
2-Butanone (MEK)	ND	1.0	2.0	t-Butyl alcohol (TBA)	ND	1.0	5.0
n-Butyl benzene	ND	1.0	0.5	sec-Butyl benzene	ND	1.0	0.5
tert-Butyl benzene	ND	1.0	0.5	Carbon Disulfide	ND	1.0	0.5
Carbon Tetrachloride	ND	1.0	0.5	Chlorobenzene	ND	1.0	0.5
Chloroethane	ND	1.0	0.5	2-Chloroethyl Vinyl Ether	ND	1.0	1.0
Chloroform	ND	1.0	0.5	Chloromethane	ND	1.0	0.5
2-Chlorotoluene	ND	1.0	0.5	4-Chlorotoluene	ND	1.0	0.5
Dibromochloromethane	ND	1.0	0.5	1,2-Dibromo-3-chloropropane	ND	1.0	0.5
1,2-Dibromoethane (EDB)	ND	1.0	0.5	Dibromomethane	ND	1.0	0.5
1,2-Dichlorobenzene	ND	1.0	0.5	1,3-Dichlorobenzene	ND	1.0	0.5
1,4-Dichlorobenzene	ND	1.0	0.5	Dichlorodifluoromethane	ND	1.0	0.5
1,1-Dichloroethane	ND	1.0	0.5	1,2-Dichloroethane (1,2-DCA)	ND	1.0	0.5
1,1-Dichloroethene	ND	1.0	0.5	cis-1,2-Dichloroethene	ND	1.0	0.5
trans-1,2-Dichloroethene	ND	1.0	0.5	1,2-Dichloropropane	ND	1.0	0.5
1,3-Dichloropropane	ND	1.0	0.5	2,2-Dichloropropane	ND	1.0	0.5
1,1-Dichloropropene	ND	1.0	0.5	cis-1,3-Dichloropropene	ND	1.0	0.5
trans-1,3-Dichloropropene	ND	1.0	0.5	Diisopropyl ether (DIPE)	ND	1.0	0.5
Ethylbenzene	ND	1.0	0.5	Ethyl tert-butyl ether (ETBE)	ND	1.0	0.5
Freon 113	ND	1.0	10	Hexachlorobutadiene	ND	1.0	0.5
Hexachloroethane	ND	1.0	0.5	2-Hexanone	ND	1.0	0.5
Isopropylbenzene	ND	1.0	0.5	4-Isopropyl toluene	ND	1.0	0.5
Methyl-t-butyl ether (MTBE)	ND	1.0	0.5	Methylene chloride	ND	1.0	0.5
4-Methyl-2-pentanone (MIBK)	ND	1.0	0.5	Naphthalene	ND	1.0	0.5
Nitrobenzene	ND	1.0	10	n-Propyl benzene	ND	1.0	0.5
Styrene	ND	1.0	0.5	1,1,1,2-Tetrachloroethane	ND	1.0	0.5
1,1,2,2-Tetrachloroethane	ND	1.0	0.5	Tetrachloroethene	ND	1.0	0.5
Toluene	ND	1.0	0.5	1,2,3-Trichlorobenzene	ND	1.0	0.5
1,2,4-Trichlorobenzene	ND	1.0	0.5	1,1,1-Trichloroethane	ND	1.0	0.5
1,1,2-Trichloroethane	ND	1.0	0.5	Trichloroethene	ND	1.0	0.5
Trichlorofluoromethane	ND	1.0	0.5	1,2,3-Trichloropropane	ND	1.0	0.5
1,2,4-Trimethylbenzene	ND	1.0	0.5	1,3,5-Trimethylbenzene	ND	1.0	0.5
Vinyl Chloride	ND	1.0	0.5	Xylenes	ND	1.0	0.5

Surrogate Recoveries (%)

%SS1:	117	%SS2:	86
%SS3:	92		

Comments: i

* water and vapor samples are reported in µg/L, soil/sludge/solid samples in mg/kg, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L, wipe samples in µg/wipe.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or coelutes with another peak; &) low surrogate due to matrix interference.

h) lighter than water immiscible sheen/product is present; i) liquid sample that contains greater than ~1 vol. % sediment; j) sample diluted due to high organic content/matrix interference; k) reporting limit near, but not identical to our standard reporting limit due to variable Encore sample weight; m) reporting limit raised due to insufficient sample amount; n) results are reported on a dry weight basis; p) see attached narrative; q) reported in ppm

DHS ELAP Certification N° 1644

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Kleinfelder, Inc.	Client Project ID: Palland	Date Sampled: 01/29/07
7133 Koll Center Pkwy, #100		Date Received: 01/29/07
	Client Contact: Jim Lehrman	Date Extracted: 01/30/07
Pleasanton, CA 94566	Client P.O.:	Date Analyzed 01/30/07

Volatile Organics by P&T and GC/MS (Basic Target List)*

Extraction Method: SW5030B Analytical Method: SW8260B Work Order: 0701565

Lab ID	0701565-005B
Client ID	B-2
Matrix	Water

Compound	Concentration *	DF	Reporting Limit	Compound	Concentration *	DF	Reporting Limit
Acetone	ND	1.0	10	Acrolein (Propenal)	ND	1.0	5.0
Acrylonitrile	ND	1.0	2.0	tert-Amyl methyl ether (TAME)	ND	1.0	0.5
Benzene	ND	1.0	0.5	Bromobenzene	ND	1.0	0.5
Bromochloromethane	ND	1.0	0.5	Bromodichloromethane	ND	1.0	0.5
Bromoform	ND	1.0	0.5	Bromomethane	ND	1.0	0.5
2-Butanone (MEK)	ND	1.0	2.0	t-Butyl alcohol (TBA)	ND	1.0	5.0
n-Butyl benzene	ND	1.0	0.5	sec-Butyl benzene	ND	1.0	0.5
tert-Butyl benzene	ND	1.0	0.5	Carbon Disulfide	ND	1.0	0.5
Carbon Tetrachloride	ND	1.0	0.5	Chlorobenzene	ND	1.0	0.5
Chloroethane	ND	1.0	0.5	2-Chloroethyl Vinyl Ether	ND	1.0	1.0
Chloroform	ND	1.0	0.5	Chloromethane	ND	1.0	0.5
2-Chlorotoluene	ND	1.0	0.5	4-Chlorotoluene	ND	1.0	0.5
Dibromochloromethane	ND	1.0	0.5	1,2-Dibromo-3-chloropropane	ND	1.0	0.5
1,2-Dibromoethane (EDB)	ND	1.0	0.5	Dibromomethane	ND	1.0	0.5
1,2-Dichlorobenzene	ND	1.0	0.5	1,3-Dichlorobenzene	ND	1.0	0.5
1,4-Dichlorobenzene	ND	1.0	0.5	Dichlorodifluoromethane	ND	1.0	0.5
1,1-Dichloroethane	ND	1.0	0.5	1,2-Dichloroethane (1,2-DCA)	ND	1.0	0.5
1,1-Dichloroethene	ND	1.0	0.5	cis-1,2-Dichloroethene	ND	1.0	0.5
trans-1,2-Dichloroethene	ND	1.0	0.5	1,2-Dichloropropane	ND	1.0	0.5
1,3-Dichloropropane	ND	1.0	0.5	2,2-Dichloropropane	ND	1.0	0.5
1,1-Dichloropropene	ND	1.0	0.5	cis-1,3-Dichloropropene	ND	1.0	0.5
trans-1,3-Dichloropropene	ND	1.0	0.5	Diisopropyl ether (DIPE)	ND	1.0	0.5
Ethylbenzene	ND	1.0	0.5	Ethyl tert-butyl ether (ETBE)	ND	1.0	0.5
Freon 113	ND	1.0	10	Hexachlorobutadiene	ND	1.0	0.5
Hexachloroethane	ND	1.0	0.5	2-Hexanone	ND	1.0	0.5
Isopropylbenzene	ND	1.0	0.5	4-Isopropyl toluene	ND	1.0	0.5
Methyl-t-butyl ether (MTBE)	ND	1.0	0.5	Methylene chloride	ND	1.0	0.5
4-Methyl-2-pentanone (MIBK)	ND	1.0	0.5	Naphthalene	ND	1.0	0.5
Nitrobenzene	ND	1.0	10	n-Propyl benzene	ND	1.0	0.5
Styrene	ND	1.0	0.5	1,1,1,2-Tetrachloroethane	ND	1.0	0.5
1,1,2,2-Tetrachloroethane	ND	1.0	0.5	Tetrachloroethene	ND	1.0	0.5
Toluene	ND	1.0	0.5	1,2,3-Trichlorobenzene	ND	1.0	0.5
1,2,4-Trichlorobenzene	ND	1.0	0.5	1,1,1-Trichloroethane	ND	1.0	0.5
1,1,2-Trichloroethane	ND	1.0	0.5	Trichloroethene	ND	1.0	0.5
Trichlorofluoromethane	ND	1.0	0.5	1,2,3-Trichloropropane	ND	1.0	0.5
1,2,4-Trimethylbenzene	ND	1.0	0.5	1,3,5-Trimethylbenzene	ND	1.0	0.5
Vinyl Chloride	ND	1.0	0.5	Xylenes	ND	1.0	0.5

Surrogate Recoveries (%)

%SS1:	117	%SS2:	96
%SS3:	100		

Comments: i

* water and vapor samples are reported in µg/L, soil/sludge/solid samples in mg/kg, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L, wipe samples in µg/wipe.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or coelutes with another peak; &) low surrogate due to matrix interference.

h) lighter than water immiscible sheen/product is present; i) liquid sample that contains greater than ~1 vol. % sediment; j) sample diluted due to high organic content/matrix interference; k) reporting limit near, but not identical to our standard reporting limit due to variable Encore sample weight; m) reporting limit raised due to insufficient sample amount; n) results are reported on a dry weight basis; p) see attached narrative; q) reported in ppm

DHS ELAP Certification N° 1644

AR Angela Rydelius, Lab Manager

Kleinfelder, Inc. 7133 Koll Center Pkwy, #100 Pleasanton, CA 94566	Client Project ID: Palland	Date Sampled: 01/29/07
		Date Received: 01/29/07
	Client Contact: Jim Lehrman	Date Extracted: 01/30/07
	Client P.O.:	Date Analyzed 01/30/07

Volatile Organics by P&T and GC/MS (Basic Target List)*

Extraction Method: SW5030B Analytical Method: SW8260B Work Order: 0701565

Lab ID	0701565-006B
Client ID	B-3
Matrix	Water

Compound	Concentration *	DF	Reporting Limit	Compound	Concentration *	DF	Reporting Limit
Acetone	ND	1.0	10	Acrolein (Propenal)	ND	1.0	5.0
Acrylonitrile	ND	1.0	2.0	tert-Amyl methyl ether (TAME)	ND	1.0	0.5
Benzene	ND	1.0	0.5	Bromobenzene	ND	1.0	0.5
Bromochloromethane	ND	1.0	0.5	Bromodichloromethane	ND	1.0	0.5
Bromoform	ND	1.0	0.5	Bromomethane	ND	1.0	0.5
2-Butanone (MEK)	ND	1.0	2.0	t-Butyl alcohol (TBA)	ND	1.0	5.0
n-Butyl benzene	ND	1.0	0.5	sec-Butyl benzene	ND	1.0	0.5
tert-Butyl benzene	ND	1.0	0.5	Carbon Disulfide	ND	1.0	0.5
Carbon Tetrachloride	ND	1.0	0.5	Chlorobenzene	ND	1.0	0.5
Chloroethane	ND	1.0	0.5	2-Chloroethyl Vinyl Ether	ND	1.0	1.0
Chloroform	ND	1.0	0.5	Chloromethane	ND	1.0	0.5
2-Chlorotoluene	ND	1.0	0.5	4-Chlorotoluene	ND	1.0	0.5
Dibromochloromethane	ND	1.0	0.5	1,2-Dibromo-3-chloropropane	ND	1.0	0.5
1,2-Dibromoethane (EDB)	ND	1.0	0.5	Dibromomethane	ND	1.0	0.5
1,2-Dichlorobenzene	ND	1.0	0.5	1,3-Dichlorobenzene	ND	1.0	0.5
1,4-Dichlorobenzene	ND	1.0	0.5	Dichlorodifluoromethane	ND	1.0	0.5
1,1-Dichloroethane	ND	1.0	0.5	1,2-Dichloroethane (1,2-DCA)	ND	1.0	0.5
1,1-Dichloroethene	ND	1.0	0.5	cis-1,2-Dichloroethene	ND	1.0	0.5
trans-1,2-Dichloroethene	ND	1.0	0.5	1,2-Dichloropropane	ND	1.0	0.5
1,3-Dichloropropane	ND	1.0	0.5	2,2-Dichloropropane	ND	1.0	0.5
1,1-Dichloropropene	ND	1.0	0.5	cis-1,3-Dichloropropene	ND	1.0	0.5
trans-1,3-Dichloropropene	ND	1.0	0.5	Diisopropyl ether (DIPE)	ND	1.0	0.5
Ethylbenzene	ND	1.0	0.5	Ethyl tert-butyl ether (ETBE)	ND	1.0	0.5
Freon 113	ND	1.0	10	Hexachlorobutadiene	ND	1.0	0.5
Hexachloroethane	ND	1.0	0.5	2-Hexanone	ND	1.0	0.5
Isopropylbenzene	ND	1.0	0.5	4-Isopropyl toluene	ND	1.0	0.5
Methyl-t-butyl ether (MTBE)	ND	1.0	0.5	Methylene chloride	ND	1.0	0.5
4-Methyl-2-pentanone (MIBK)	ND	1.0	0.5	Naphthalene	ND	1.0	0.5
Nitrobenzene	ND	1.0	10	n-Propyl benzene	ND	1.0	0.5
Styrene	ND	1.0	0.5	1,1,1,2-Tetrachloroethane	ND	1.0	0.5
1,1,2,2-Tetrachloroethane	ND	1.0	0.5	Tetrachloroethene	ND	1.0	0.5
Toluene	ND	1.0	0.5	1,2,3-Trichlorobenzene	ND	1.0	0.5
1,2,4-Trichlorobenzene	ND	1.0	0.5	1,1,1-Trichloroethane	ND	1.0	0.5
1,1,2-Trichloroethane	ND	1.0	0.5	Trichloroethene	ND	1.0	0.5
Trichlorofluoromethane	ND	1.0	0.5	1,2,3-Trichloropropane	ND	1.0	0.5
1,2,4-Trimethylbenzene	ND	1.0	0.5	1,3,5-Trimethylbenzene	ND	1.0	0.5
Vinyl Chloride	ND	1.0	0.5	Xylenes	ND	1.0	0.5

Surrogate Recoveries (%)

%SS1:	116	%SS2:	94
%SS3:	101		

Comments: i

* water and vapor samples are reported in µg/L, soil/sludge/solid samples in mg/kg, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L, wipe samples in µg/wipe.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or coelutes with another peak; &) low surrogate due to matrix interference.

h) lighter than water immiscible sheen/product is present; i) liquid sample that contains greater than ~1 vol. % sediment; j) sample diluted due to high organic content/matrix interference; k) reporting limit near, but not identical to our standard reporting limit due to variable Encore sample weight; m) reporting limit raised due to insufficient sample amount; n) results are reported on a dry weight basis; p) see attached narrative; q) reported in ppm

DHS ELAP Certification N° 1644

AR Angela Rydelius, Lab Manager

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Kleinfelder, Inc. 7133 Koll Center Pkwy, #100 Pleasanton, CA 94566	Client Project ID: Palland	Date Sampled: 01/29/07
		Date Received: 01/29/07
	Client Contact: Jim Lehrman	Date Extracted: 01/29/07
	Client P.O.:	Date Analyzed 01/30/07-01/31/07

CAM / CCR 17 Metals*

Lab ID	0701565-001A	0701565-002A	0701565-003A		Reporting Limit for DF =1; ND means not detected above the reporting limit	
Client ID	B-1-4'	B-2-4'	B-3-4'			
Matrix	S	S	S		S	W
Extraction Type	TTLC	TTLC	TTLC		mg/Kg	mg/L

ICP-MS Metals, Concentration*

Analytical Method: 6020A Extraction Method: SW3050B Work Order: 0701565

Dilution Factor	1	1	1		1	1
Antimony	ND	ND	ND		0.5	NA
Arsenic	2.2	1.9	2.6		0.5	NA
Barium	78	41	59		5.0	NA
Beryllium	ND	ND	ND		0.5	NA
Cadmium	ND	ND	ND		0.25	NA
Chromium	26	20	24		0.5	NA
Cobalt	5.8	4.3	5.2		0.5	NA
Copper	10	7.1	8.1		0.5	NA
Lead	3.3	1.9	2.3		0.5	NA
Mercury	0.053	ND	ND		0.05	NA
Molybdenum	ND	ND	ND		0.5	NA
Nickel	26	20	21		0.5	NA
Selenium	ND	ND	ND		0.5	NA
Silver	ND	ND	ND		0.5	NA
Thallium	ND	ND	ND		0.5	NA
Vanadium	36	34	36		0.5	NA
Zinc	28	16	22		5.0	NA
%SS:	104	96	98			

Comments

*water samples are reported in µg/L, product/oil/non-aqueous liquid samples and all TCLP / STLC / DISTLC / SPLP extracts are reported in mg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter.

means surrogate diluted out of range; ND means not detected above the reporting limit; N/A means not applicable to this sample or instrument.

i) aqueous sample containing greater than ~1 vol. % sediment; for DISSOLVED metals, this sample has been preserved prior to filtration; for TTLC metals, a representative sediment-water mixture was digested; j) reporting limit raised due to insufficient sample amount; J) analyte detected below quantitation limits; k) reporting limit raised due to matrix interference; m) estimated value due to low/high surrrogate recovery, caused by matrix interference; n) results are reported on a dry weight basis; p) see attached narrative.

DHS ELAP Certification N° 1644

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Kleinfelder, Inc. 7133 Koll Center Pkwy, #100 Pleasanton, CA 94566	Client Project ID: Palland	Date Sampled: 01/29/07
		Date Received: 01/29/07
	Client Contact: Jim Lehrman	Date Extracted: 01/29/07-01/31/07
	Client P.O.:	Date Analyzed 01/30/07-01/31/07

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline*

Extraction method: SW5030B Analytical methods: SW8015Cm Work Order: 0701565

Lab ID	Client ID	Matrix	TPH(g)	DF	% SS
001A	B-1-4'	S	ND	1	101
002A	B-2-4'	S	ND	1	92
003A	B-3-4'	S	ND	1	91
004A	B-1	W	ND,i	1	89
005A	B-2	W	ND,i	1	92
006A	B-3	W	ND,i	1	93

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	W	50	μg/L
	S	1.0	mg/Kg

* water and vapor samples and all TCLP & SPLP extracts are reported in μg/L, soil/sludge/solid samples in mg/kg, wipe samples in μg/wipe, product/oil/non-aqueous liquid samples in mg/L.

cluttered chromatogram; sample peak coelutes with surrogate peak.

+The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified gasoline is significant; b) heavier gasoline range compounds are significant(aged gasoline?); c) lighter gasoline range compounds (the most mobile fraction) are significant; d) gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline?; e) TPH pattern that does not appear to be derived from gasoline (stoddard solvent / mineral spirit?); f) one to a few isolated non-target peaks present; g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible sheen/product is present; i) liquid sample that contains greater than ~1 vol. % sediment; j) reporting limit raised due to high MTBE content; k) TPH pattern that does not appear to be derived from gasoline (aviation gas). m) no recognizable pattern; n) TPH(g) value derived using a client specified carbon range; o) results are reported on a dry weight basis; p) see attached narrative.

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Kleinfelder, Inc. 7133 Koll Center Pkwy, #100 Pleasanton, CA 94566	Client Project ID: Palland	Date Sampled: 01/29/07
		Date Received: 01/29/07
	Client Contact: Jim Lehrman	Date Extracted: 01/29/07
	Client P.O.:	Date Analyzed 01/29/07-01/31/07

Diesel (C10-23) and Oil (C18+) Range Extractable Hydrocarbons as Diesel and Motor Oil*

Extraction method: SW3510C/SW3550C Analytical methods: SW8015C Work Order: 0701565

Lab ID	Client ID	Matrix	TPH(d)	TPH(mo)	DF	% SS
0701565-001A	B-1-4'	S	ND	ND	1	97
0701565-002A	B-2-4'	S	ND	ND	1	99
0701565-003A	B-3-4'	S	ND	ND	1	97
0701565-004A	B-1	W	ND,i	ND	1	95
0701565-005A	B-2	W	53,f,b,i	ND	1	98
0701565-006A	B-3	W	ND,i	ND	1	96

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	W	50	250	µg/L
	S	1.0	5.0	mg/Kg

* water samples are reported in µg/L, wipe samples in µg/wipe, soil/solid/sludge samples in mg/kg, product/oil/non-aqueous liquid samples in mg/L, and all DISTLC / STLC / SPLP / TCLP extracts are reported in µg/L.

cluttered chromatogram resulting in coeluted surrogate and sample peaks, or; surrogate peak is on elevated baseline, or; surrogate has been diminished by dilution of original extract.

+The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified diesel is significant; b) diesel range compounds are significant; no recognizable pattern; c) aged diesel? is significant); d) gasoline range compounds are significant; e) unknown medium boiling point pattern that does not appear to be derived from diesel (asphalt?); f) one to a few isolated peaks present; g) oil range compounds are significant; h) lighter than water immiscible sheen/product is present; i) liquid sample that contains greater than ~1 vol. % sediment; k) kerosene/kerosene range/jet fuel; l) bunker oil; m) fuel oil; n) stoddard solvent/mineral spirit; o) mineral oil; p) see attached narrative.

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QC SUMMARY REPORT FOR SW8260B

W.O. Sample Matrix: Soil QC Matrix: Soil WorkOrder 0701565

EPA Method SW8260B **Extraction SW5030B** **BatchID: 25943** **Spiked Sample ID: 0701541-005A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)			
	mg/Kg	mg/Kg	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	RPD	LCS/LCSD	RPD
tert-Amyl methyl ether (TAME)	ND	0.050	85.4	92.6	8.01	89	92.4	3.71	70 - 130	30	70 - 130	30
Benzene	ND	0.050	121	127	4.85	120	126	4.84	70 - 130	30	70 - 130	30
t-Butyl alcohol (TBA)	ND	0.25	100	117	15.5	98	115	15.6	70 - 130	30	70 - 130	30
Chlorobenzene	ND	0.050	97.1	101	4.39	97.2	101	3.61	70 - 130	30	70 - 130	30
1,2-Dibromoethane (EDB)	ND	0.050	104	112	7.66	107	106	1.31	70 - 130	30	70 - 130	30
1,2-Dichloroethane (1,2-DCA)	ND	0.050	113	121	6.85	116	122	5.14	70 - 130	30	70 - 130	30
1,1-Dichloroethene	ND	0.050	122	112	8.58	119	98.1	19.1	70 - 130	30	70 - 130	30
Diisopropyl ether (DIPE)	ND	0.050	101	108	6.28	104	105	1.27	70 - 130	30	70 - 130	30
Ethyl tert-butyl ether (ETBE)	ND	0.050	93.5	100	7.01	96.2	98.3	2.17	70 - 130	30	70 - 130	30
Methyl-t-butyl ether (MTBE)	ND	0.050	95.5	105	9.98	99.6	105	5.49	70 - 130	30	70 - 130	30
Toluene	ND	0.050	100	108	6.78	105	95.2	9.89	70 - 130	30	70 - 130	30
Trichloroethene	ND	0.050	77.7	82.4	5.80	78.1	80.9	3.48	70 - 130	30	70 - 130	30
%SS1:	99	0.050	114	114	0	116	115	1.25	70 - 130	30	70 - 130	30
%SS2:	97	0.050	92	93	1.20	95	84	12.4	70 - 130	30	70 - 130	30
%SS3:	84	0.050	106	106	0	108	100	7.46	70 - 130	30	70 - 130	30

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 25943 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0701565-001	1/29/07 10:04 AM	1/29/07	1/30/07 6:55 AM	0701565-002	1/29/07 8:42 AM	1/29/07	1/30/07 8:49 AM
0701565-003	1/29/07 7:55 AM	1/29/07	1/30/07 9:34 AM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2)

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery

N/A = not enough sample to perform matrix spike and matrix spike duplicate

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS ELAP Certification N° 1644

QA/QC Officer

QC SUMMARY REPORT FOR SW8260B

W.O. Sample Matrix: Water QC Matrix: Water WorkOrder 0701565

EPA Method SW8260B **Extraction SW5030B** **BatchID: 25975** **Spiked Sample ID: 0701560-007B**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)			
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	RPD	LCS/LCSD	RPD
tert-Amyl methyl ether (TAME)	0.54	10	88.9	84.6	4.63	82.8	80.4	2.99	70 - 130	30	70 - 130	30
Benzene	ND	10	119	115	3.93	116	114	1.58	70 - 130	30	70 - 130	30
t-Butyl alcohol (TBA)	10	50	95.7	97.2	1.22	102	103	1.04	70 - 130	30	70 - 130	30
Chlorobenzene	ND	10	103	96.4	6.99	91.6	89.2	2.58	70 - 130	30	70 - 130	30
1,2-Dibromoethane (EDB)	ND	10	103	96.5	6.12	97.2	94.9	2.30	70 - 130	30	70 - 130	30
1,2-Dichloroethane (1,2-DCA)	0.62	10	112	104	7.29	110	109	0.626	70 - 130	30	70 - 130	30
1,1-Dichloroethene	ND	10	96.9	88.8	8.66	91.5	104	13.2	70 - 130	30	70 - 130	30
Diisopropyl ether (DIPE)	ND	10	102	94.4	7.97	94.4	92.1	2.53	70 - 130	30	70 - 130	30
Ethyl tert-butyl ether (ETBE)	ND	10	92.5	86.5	6.65	88.4	86.7	1.95	70 - 130	30	70 - 130	30
Methyl-t-butyl ether (MTBE)	17	10	93	91.3	0.623	92.5	90.5	2.22	70 - 130	30	70 - 130	30
Toluene	ND	10	102	91.5	11.3	87.7	85.3	2.77	70 - 130	30	70 - 130	30
Trichloroethene	ND	10	79.7	73.9	7.54	74.6	73.3	1.73	70 - 130	30	70 - 130	30
%SS1:	102	10	109	112	2.46	113	115	1.70	70 - 130	30	70 - 130	30
%SS2:	96	10	92	91	1.62	86	85	0.841	70 - 130	30	70 - 130	30
%SS3:	81	10	100	99	0.985	100	98	1.66	70 - 130	30	70 - 130	30

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 25975 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0701565-004	1/29/07 10:40 AM	1/30/07	1/30/07 3:18 AM	0701565-005	1/29/07 9:10 AM	1/30/07	1/30/07 4:04 AM
0701565-006	1/29/07 9:25 AM	1/30/07	1/30/07 4:50 AM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2)

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS ELAP Certification N° 1644

QA/QC Officer

QC SUMMARY REPORT FOR 6020A

W.O. Sample Matrix: Soil QC Matrix: Soil WorkOrder 0701565

EPA Method 6020A **Extraction SW3050B** **BatchID: 25931** **Spiked Sample ID 0701514-001A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	Spiked	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)			
	mg/Kg	mg/Kg	% Rec.	% Rec.	% RPD	mg/Kg	% Rec.	% Rec.	% RPD	MS / MSD	RPD	LCS/LCSD	RPD
Antimony	0.54	50	99.2	101	1.58	10	104	105	8.19	75 - 125	20	80 - 120	20
Arsenic	4.2	50	103	102	0.795	10	94.5	96	5.41	75 - 125	20	80 - 120	20
Barium	150	500	104	106	2.11	100	92.1	92.9	1.78	75 - 125	20	80 - 120	20
Beryllium	0.56	50	88.1	88.8	0.804	10	97.7	98.2	3.89	75 - 125	20	80 - 120	20
Cadmium	0.38	50	98	99.6	1.61	10	96.9	98.4	1.98	75 - 125	20	80 - 120	20
Chromium	98	50	107	109	0.792	10	94.4	95.8	6.23	75 - 125	20	80 - 120	20
Cobalt	24	50	90.9	92.6	1.21	10	98.4	98.7	0.877	75 - 125	20	80 - 120	20
Copper	36	50	112	112	0	10	89.1	87.9	12.6	75 - 125	20	80 - 120	20
Lead	13	50	100	102	1.29	10	98.2	98.2	0	75 - 125	20	80 - 120	20
Mercury	0.058	2.5	101	103	2.41	0.50	84	83.9	15.8	75 - 125	20	80 - 120	20
Molybdenum	0.6	50	97.4	99.1	1.67	10	93.1	94.1	1.39	75 - 125	20	80 - 120	20
Nickel	180	50	100	104	0.860	10	95.8	95.4	6.63	75 - 125	20	80 - 120	20
Selenium	ND	50	100	102	1.69	10	94.6	96.2	3.80	75 - 125	20	80 - 120	20
Silver	ND	50	99.9	100	0.220	10	97.7	97.3	1.31	75 - 125	20	80 - 120	20
Thallium	ND	50	99.7	100	0.719	10	94.9	94.5	1.11	75 - 125	20	80 - 120	20
Vanadium	67	50	102	104	0.927	10	93.5	95	4.56	75 - 125	20	80 - 120	20
Zinc	99	500	97.6	98.7	0.915	100	96	96.9	1.07	75 - 125	20	80 - 120	20
%SS:	94	250	100	102	1.82	250	98	98	0	70 - 130	20	70 - 130	20

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 25931 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0701565-001A	1/29/07 10:04 AM	1/29/07	1/30/07 7:45 AM	0701565-001A	1/29/07 10:04 AM	1/29/07	1/31/07 11:56 PM
0701565-002A	1/29/07 8:42 AM	1/29/07	1/30/07 7:52 AM	0701565-002A	1/29/07 8:42 AM	1/29/07	1/31/07 11:51 PM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery

N/A = not applicable to this method

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte

DHS ELAP Certification N° 1644

AR QA/QC Officer

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QC SUMMARY REPORT FOR 6020A

W.O. Sample Matrix: Soil QC Matrix: Soil WorkOrder 0701565

EPA Method 6020A **Extraction SW3050B** **BatchID: 25978** **Spiked Sample ID 0701565-003A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	Spiked	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)			
	mg/Kg	mg/Kg	% Rec.	% Rec.	% RPD	mg/Kg	% Rec.	% Rec.	% RPD	MS / MSD	RPD	LCS/LCSD	RPD
Antimony	ND	50	109	108	1.58	10	102	106	3.36	75 - 125	20	80 - 120	20
Arsenic	2.6	50	105	103	2.02	10	96.1	97.4	1.28	75 - 125	20	80 - 120	20
Barium	59	500	112	111	1.26	100	93.2	95.4	2.31	75 - 125	20	80 - 120	20
Beryllium	ND	50	87.4	86.1	1.49	10	90.6	90.3	0.376	75 - 125	20	80 - 120	20
Cadmium	ND	50	105	103	1.79	10	96.8	99.4	2.65	75 - 125	20	80 - 120	20
Chromium	24	50	113	113	0	10	97.4	98.3	0.930	75 - 125	20	80 - 120	20
Cobalt	5.2	50	107	104	2.30	10	97.8	97.4	0.348	75 - 125	20	80 - 120	20
Copper	8.1	50	106	103	2.16	10	95.3	96.1	0.789	75 - 125	20	80 - 120	20
Lead	2.3	50	107	104	3.07	10	97	99	2.12	75 - 125	20	80 - 120	20
Mercury	ND	2.5	111	108	2.50	0.50	98.1	98.9	0.811	75 - 125	20	80 - 120	20
Molybdenum	ND	50	100	98.8	1.64	10	91	94.6	3.95	75 - 125	20	80 - 120	20
Nickel	21	50	110	107	2.10	10	98.5	100	1.78	75 - 125	20	80 - 120	20
Selenium	ND	50	112	108	3.14	10	94.7	97.3	2.68	75 - 125	20	80 - 120	20
Silver	ND	50	105	104	1.61	10	99.6	102	2.65	75 - 125	20	80 - 120	20
Thallium	ND	50	108	105	2.69	10	95.8	97.9	2.15	75 - 125	20	80 - 120	20
Vanadium	36	50	116	117	0.654	10	95.7	96.8	1.09	75 - 125	20	80 - 120	20
Zinc	22	500	105	103	1.89	100	93.7	96	2.41	75 - 125	20	80 - 120	20
%SS:	98	250	104	103	1.31	250	97	100	3.66	70 - 130	20	70 - 130	20

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 25978 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0701565-003A	1/29/07 7:55 AM	1/29/07	1/30/07 7:20 AM	0701565-003A	1/29/07 7:55 AM	1/29/07	1/31/07 11:27 PM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not applicable to this method.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte

DHS ELAP Certification N° 1644 QA/QC Officer

QC SUMMARY REPORT FOR SW8021B/8015Cm

W.O. Sample Matrix: Soil QC Matrix: Soil WorkOrder: 0701565

EPA Method SW8021B/8015Cm **Extraction SW5030B** **BatchID: 25922** **Spiked Sample ID: 0701514-001A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)			
	mg/Kg	mg/Kg	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	RPD	LCS/LCSD	RPD
TPH(btex£	ND	0.60	95.6	104	8.62	104	98.4	5.82	70 - 130	30	70 - 130	30
MTBE	ND	0.10	104	92.7	11.6	97.5	90.4	7.56	70 - 130	30	70 - 130	30
Benzene	ND	0.10	114	98.1	14.7	107	106	1.45	70 - 130	30	70 - 130	30
Toluene	ND	0.10	120	107	11.5	117	113	2.83	70 - 130	30	70 - 130	30
Ethylbenzene	ND	0.10	82.3	104	22.9	97.9	79.1	21.3	70 - 130	30	70 - 130	30
Xylenes	ND	0.30	110	113	2.99	123	120	2.74	70 - 130	30	70 - 130	30
%SS:	89	0.10	104	98	5.94	100	102	1.98	70 - 130	30	70 - 130	30

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 25922 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0701565-001	1/29/07 10:04 AM	1/29/07	1/30/07 1:31 AM	0701565-002	1/29/07 8:42 AM	1/29/07	1/30/07 2:31 AM
0701565-003	1/29/07 7:55 AM	1/29/07	1/30/07 3:01 AM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2)

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery

£ TPH(btex) = sum of BTEX areas from the FID

cluttered chromatogram; sample peak coelutes with surrogate peak

DHS ELAP Certification N° 1644

JR QA/QC Officer

QC SUMMARY REPORT FOR SW8021B/8015Cm

W.O. Sample Matrix: Water QC Matrix: Water WorkOrder: 0701565

EPA Method SW8021B/8015Cm **Extraction SW5030B** **BatchID: 25976** **Spiked Sample ID: 0701585-008a**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)			
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	RPD	LCS/LCSD	RPD
TPH(btex$^{\pounds}$	ND	60	89.3	99.6	10.8	99.2	101	1.46	70 - 130	30	70 - 130	30
MTBE	ND	10	84.7	81	4.51	85.5	86.8	1.51	70 - 130	30	70 - 130	30
Benzene	ND	10	101	101	0	106	106	0	70 - 130	30	70 - 130	30
Toluene	ND	10	100	101	1.08	106	104	1.28	70 - 130	30	70 - 130	30
Ethylbenzene	ND	10	104	105	0.853	108	108	0	70 - 130	30	70 - 130	30
Xylenes	ND	30	117	117	0	120	120	0	70 - 130	30	70 - 130	30
%SS:	101	10	93	93	0	97	95	2.12	70 - 130	30	70 - 130	30

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 25976 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0701565-004	1/29/07 10:40 AM	1/31/07	1/31/07 7:44 AM	0701565-005	1/29/07 9:10 AM	1/31/07	1/31/07 10:27 PM
0701565-006	1/29/07 9:25 AM	1/31/07	1/31/07 8:50 AM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery

£ TPH(btex) = sum of BTEX areas from the FID

cluttered chromatogram; sample peak coelutes with surrogate peak

DHS ELAP Certification N° 1644

JR QA/QC Officer

QC SUMMARY REPORT FOR SW8015C

W.O. Sample Matrix: Soil QC Matrix: Soil WorkOrder 0701565

EPA Method SW8015C **Extraction SW3550C** **BatchID: 25966** **Spiked Sample ID: 0701548-001A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)			
	mg/Kg	mg/Kg	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	RPD	LCS/LCSD	RPD
TPH(d)	ND	20	105	104	0.795	93.5	95.5	2.06	70 - 130	30	70 - 130	30
%SS:	102	50	102	101	0.898	99	100	0.950	70 - 130	30	70 - 130	30

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 25966 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0701565-001	1/29/07 10:04 AM	1/29/07	1/29/07 9:04 PM	0701565-002	1/29/07 8:42 AM	1/29/07	1/29/07 10:13 PM
0701565-003	1/29/07 7:55 AM	1/29/07	1/29/07 11:21 PM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2)

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS ELAP Certification N° 1644

QA/QC Officer

QC SUMMARY REPORT FOR SW8015C

W.O. Sample Matrix: Water QC Matrix: Water WorkOrder 0701565

EPA Method SW8015C	**Extraction SW3510C**			**BatchID: 25977**				**Spiked Sample ID: N/A**			
Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)			
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	RPD	LCS/LCSD	RPD
TPH(d)	N/A	1000	N/A	N/A	N/A	118	128	7.95	N/A	N/A	70 - 130	30
%SS:	N/A	2500	N/A	N/A	N/A	106	104	2.07	N/A	N/A	70 - 130	30

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 25977 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0701565-004	1/29/07 10:40 AM	1/29/07	1/31/07 5:42 PM	0701565-005	1/29/07 9:10 AM	1/29/07	1/30/07 12:30 AM
0701565-006	1/29/07 9:25 AM	1/29/07	1/31/07 6:51 PM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2)

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery

N/A = not enough sample to perform matrix spike and matrix spike duplicate

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content

DHS ELAP Certification N° 1644

QA/QC Officer

CONTRA COSTA
HEALTH SERVICES

CONTRA COSTA
ENVIRONMENTAL HEALTH DIVISION
2120 DIAMOND BOULEVARD, SUITE 200
CONCORD, CA 94520
(925) 646-5225
www.cocoeh.org

Well Permit

WP0007435

PR Number:	28494	PE Number:	4301
Date Received:	23 JAN 07	Permit Number:	07B-1062

Permit Approved/Issued by: Jeff Edwards Date Issued: 26 JAN 07
Environmental Health Specialist

NEW WELL	[✓ (3) SOIL BORINGS]	WELL ABANDONMENT	REPAIR

The issuance of this permit by Contra Costa County Environmental Health Division does not guarantee a satisfactory and an indefinite operation of any well. Permit expires in 180 calendar days from date of approval. Permits are non-transferable, and can be suspended or revoked. If more time is required for the project, a time extension may be granted if reasons warrant it in writing.

PROJECT SITE INFORMATION

Site Address:	BRIDGEHEAD RD & MAIN ST, OAKLEY		
APN:	037-040-007	Lot/Parcel #:	
Subdivision #:		Minor Subdivision #:	

DRILLER / CONSULTANT INFORMATION

Driller:	RESONANT SONIC INTERNATIONAL	Contact Person:	TUAN NGUYEN
Phone #:	530-668-2424	FAX#:	530-668-2429
Consultant:	KLEINFELDER	Contact Person:	MEGAN HOPKINS
Phone #:	925-484-1700	FAX#:	925-484-5838

LEGAL OWNER INFORMATION

Legal Owner Name:	OXFOOT ASSOCIATES LLC		
Owner Address:	24737 ARNOLD DRIVE		
City/State/Zip:	SONOMA, CA 95476		
Phone #:	707-974-3824	Alternate Phone #:	

Contact the Contra Costa County Environmental Health Division appointment desk and obtain a confirmed appointment time and date prior to any drilling construction or destruction of a well. ***Voice mail messages are not acceptable.*** The appointment desk sends confirmation via telephone or fax.

Well drillers must posses a valid C-57 license and must have on file a performance bond of $5,000.00 with Contra Costa County before commencing with any well construction, destruction or repairs.

WELL PERMIT CONDITIONS:

1. Proper annular seals and surface construction features are to be installed and required water analyses completed within 30 days of commencing drilling.
2. Monitoring well/soil boring shall be destroyed pursuant to County regulations within 30 days of completing monitoring activities.
3. Other: ______________________________

Final Approval by: ____________________ **Date:** ____________________

(08/02)

CONTRA COSTA
HEALTH SERVICES

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CONCORD, CA 94520
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Well Permit

WP0007434

PR Number: 28493 **PE Number:** 4301
Date Received: 23 JAN 07 **Permit Number:** 07B-1061
Permit Approved/Issued by: Jeff Edwards **Date Issued:** 26 JAN 07
Environmental Health Specialist

NEW WELL | [✓ (3) SOIL BORINGS] | WELL ABANDONMENT | REPAIR

The issuance of this permit by Contra Costa County Environmental Health Division does not guarantee a satisfactory and an indefinite operation of any well. Permit expires in 180 calendar days from date of approval. Permits are non-transferable, and can be suspended or revoked. If more time is required for the project, a time extension may be granted if reasons warrant it in writing.

PROJECT SITE INFORMATION

Site Address: BRIDGEHEAD RD & MAIN ST, OAKLEY
APN: 037-040-015 **Lot/Parcel #:**
Subdivision #: **Minor Subdivision #:**

DRILLER / CONSULTANT INFORMATION

Driller: RESONANT SONIC INTERNATIONAL **Contact Person:** TUAN NGUYEN
Phone #: 530-668-2424 **FAX#:** 530-668-2429
Consultant: KLEINFELDER **Contact Person:** MEGAN HOPKINS
Phone #: 925-484-1700 **FAX#:** 925-484-5838

LEGAL OWNER INFORMATION

Legal Owner Name: OXFOOT ASSOCIATES LLC
Owner Address: 24737 ARNOLD DRIVE
City/State/Zip: SONOMA, CA 95476
Phone #: 707-974-3824 **Alternate Phone #:**

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2. Monitoring well/soil boring shall be destroyed pursuant to County regulations within 30 days of completing monitoring activities.
3. Other: ______________________________

Final Approval by: ____________________ **Date:** ____________________

(08/02)