PUBLIC REVIEW DRAFT

OAKLEY DOWNTOWN SPECIFIC PLAN ENVIRONMENTAL IMPACT REPORT

STATE CLEARINGHOUSE NO. 2008112089

LSA

September 2009

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STATE CLEARINGHOUSE NO. 2008112089

Submitted to:

City of Oakley
3231 Main Street
Oakley, CA 94561

Prepared by:

LSA Associates, Inc.
2215 Fifth Street
Berkeley, CA 94710

LSA

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I. INTRODUCTION

A. PURPOSE OF THE EIR

In compliance with the California Environmental Quality Act (CEQA), this Draft Environmental Impact Report (EIR) describes the environmental consequences that could be associated with adoption and implementation of the Oakley Downtown Specific Plan (DTSP), also referred to in this document as the "proposed project." This EIR is designed to fully inform City of Oakley decision-makers, other responsible agencies, and the general public of the proposed DTSP and the potential environmental consequences of its approval. The EIR also examines alternatives to the DTSP and recommends a set of mitigation measures to reduce or avoid potentially significant impacts. The City of Oakley is the Lead Agency for environmental review of the proposed DTSP. This EIR will be used by the City of Oakley in their review of the proposed project and various approvals required to implement the DTSP, as described in Chapter III, Project Description.

A "tiered" approach will be used to meet the requirements of CEQA for adoption and implementation of the DTSP. This EIR is a Program EIR. Specific projects proposed as part of the Specific Plan will be examined in light of the Program EIR to determine whether additional environmental documents must be prepared. Section 15168 of the *CEQA Guidelines* defines a Program EIR as follows:

> *A program EIR is an EIR which may be prepared on a series of actions that can be characterized as one large project and are related either: (1) geographically; (2) as logical parts in the chain of contemplated actions; (3) in connection with issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program; or (4) as individual activities carried out under the same authorizing statutory or regulatory authority and having generally similar environmental effects which can be mitigated in similar ways.*
>
> *Use of a program EIR can provide the following advantages: (1) provide an occasion for a more exhaustive consideration of effects and alternatives than would be practical in an EIR on an individual action; (2) ensure consideration of cumulative impacts that might be slighted in a case-by-case analysis; (3) avoid duplicative reconsideration of basic policy considerations; (4) allow the Lead Agency to consider broad policy alternatives and program wide mitigation measures at an early time when the agency has greater flexibility to deal with basic problems or cumulative impacts; and (5) allow reduction in paperwork.*

This Program EIR identifies general effects of implementation of the DTSP. It is assumed that individual development projects proposed within the DTSP area would receive project-specific environmental evaluation, as necessary, during the development review process.

B. PROPOSED PROJECT

The DTSP encompasses an approximately 80-acre area (referred to in this document as either the "DTSP area" or "DTSP site") within Downtown Oakley. The DTSP contains the following four primary elements that are intended to achieve a cohesive, inviting, and lively pedestrian environment:

- A land use and revitalization strategy that identifies key Redevelopment Opportunity Sites;
- Roadway capital improvement projects for Main Street and other Downtown streets as well as the Main Street Realignment;
- Implementation actions and efforts needed to accomplish the plan objectives; and
- Design and development standards and guidelines to shape streetscape improvements, façade improvements, and new development throughout the DTSP area.

The DTSP's land use and revitalization strategy envisions the redevelopment of eight key Redevelopment Opportunity Sites on vacant or underutilized parcels in the Downtown. The Main Street Realignment (Realignment) is the primary capital improvement called for by the DTSP, and is a major component of the DTSP vision. The Realignment would consist of an approximately ½-mile new four-lane northerly bypass of Main Street, from just east of Gardenia Avenue to just west of Second Street. Three options for the configuration of the east end of the Realignment are considered in this EIR. Continuous storefronts along Main Street and large footprint commercial development along the Main Street Realignment could create up to 360,000 square feet of commercial space. Infill housing on the upper floors and adjacent frontages could provide up to 300 dwelling units. The proposed project is described in greater detail in Chapter III, Project Description.

C. EIR SCOPE

The City of Oakley circulated a Notice of Preparation (NOP) for the DTSP on November 21, 2008, to help identify the types of impacts that could result from implementation of the DTSP, as well as potential areas of controversy. The NOP was mailed to public agencies and organizations considered likely to be interested in the project and its potential impacts. A scoping session for the Draft EIR was held before the Planning Commission on December 5, 2008. Comments on the NOP were received by the City and considered during the preparation of the EIR. A copy of the NOP and each comment letter received is included in Appendix A of this EIR.

Based on the analysis provided in the Initial Study (included as Appendix B), consultation with City staff, and review of comments received as part of the scoping process, the following environmental topics are addressed as separate sections of this EIR:

- Cultural Resources
- Transportation, Circulation and Parking
- Air Quality
- Global Climate Change
- Noise

D. REPORT ORGANIZATION

This EIR is organized into the following chapters:

- *Chapter I – Introduction:* Discusses the overall EIR purpose, provides a summary of the proposed project and the EIR scope, and summarizes the organization of the EIR.
- *Chapter II – Summary*: Provides a summary of the significant impacts that would result from implementation of the proposed DTSP and describes mitigation measures recommended to reduce or avoid significant impacts. Discussions of potential areas of controversy and alternatives to the proposed project are also provided.
- *Chapter III – Project Description*: Provides a description of the DTSP in terms that are relevant to this environmental review, including a description of the DTSP site, the regulatory context, the DTSP development assumptions, and required approvals.
- *Chapter IV – Setting, Impacts and Mitigation Measures:* Describes the following for each environmental topic: existing conditions (setting); potential environmental impacts and their level of significance; and mitigation measures recommended to mitigate identified impacts. Potential adverse impacts are identified by levels of significance, as follows: less-than-significant impacts (LTS), significant impacts (S), and significant and unavoidable impact (SU). The significance of each impact is categorized before and after implementation of any recommended mitigation measure.
- C*hapter V – Alternatives:* Provides an evaluation of three alternative development scenarios to the proposed DTSP, including a No Project alternative.
- *Chapter VI – CEQA-Required Assessment Conclusions:* Provides the required analysis of the overall impacts of the proposed DTSP, including: effects found not to be significant; growth-inducing impacts; significant irreversible and unavoidable impacts; and cumulative impacts for the environmental issues found to have significant effects.
- *Chapter VII – Report Preparation*: Identifies the preparers of the EIR, references used and persons and organizations contacted.

II. SUMMARY

A. PROJECT UNDER REVIEW

This Draft EIR has been prepared to evaluate the environmental impacts of the Oakley Downtown Specific Plan (DTSP), or the "proposed project." The DTSP encompasses an approximately 80-acre area (referred to in this document as either the "DTSP area" or "DTSP site") within Downtown Oakley. The DTSP's land use and revitalization strategy envisions the redevelopment of eight key Redevelopment Opportunity Sites on vacant or underutilized parcels in the Downtown. The Main Street Realignment (Realignment) is the primary capital improvement called for by the DTSP, and is a major component of the DTSP vision. The Realignment would consist of an approximately ½-mile four-lane northerly bypass of Main Street, from just east of Gardenia Avenue to just west of Second Street. Three options for the configuration of the east end of the Realignment are considered in this EIR. Continuous storefronts along Main Street and large footprint commercial development along the Main Street Realignment could create up to 360,000 square feet of commercial space. Infill housing on the upper floors and adjacent frontages could provide up to 300 dwelling units.

Development envisioned under the DTSP would require the following discretionary approvals: General Plan Amendments to ensure text and map consistency between the General Plan and the DTSP for the land use mix, density, and other Downtown characteristics; Zoning Ordinance Amendments to create the Downtown Specific Plan (DSP) zoning district and revisions to the Oakley Redevelopment Area Planned Unit District (RDA PUD) for consistency with the land uses and design guidelines specified by the DTSP; and Rezoning of the DTSP site to the DSP District. Subsequent discretionary actions by the City would be required for the implementation of the capital improvements projects envisioned by the DTSP, including the Main Street Improvements and the Main Street Realignment, as well as for individual development projects proposed under the DTSP.

B. SUMMARY OF IMPACTS AND MITIGATION MEASURES

This summary provides an overview of the analysis contained in the Initial Study (included in Appendix B) and Chapter IV, Setting, Impacts, and Mitigation Measures. *CEQA Guidelines* §15123(b) requires a summary to include discussion of: (1) each significant effect with proposed mitigation measures and alternatives that would reduce or avoid that effect; (2) areas of controversy known to the Lead Agency including issues raised by agencies and the public; and (3) issues to be resolved including the choice among alternatives and whether or how to mitigate the significant effects.

The following section includes a discussion of: (1) the Initial Study findings; (2) potential areas of controversy; (3) significant impacts, with proposed mitigation measures that would reduce or avoid those impacts; (4) cumulative impacts; (5) significant irreversible and unavoidable impacts; and (6) alternatives to the proposed project that would reduce or avoid the environmental impacts of the project. A summary is also required to discuss issues to be resolved, including the choice among alternatives, and whether or how to mitigate significant environmental effects.

1. Findings of the Initial Study

The Initial Study identified no impacts to the following environmental issues:

- agricultural resources
- land use and planning
- mineral resources
- population and housing

The Initial Study identified potentially significant impacts to the following environmental issues; however, these impacts would be mitigated to a less-than-significant level with implementation of the mitigation measures recommended in the Initial Study.

- aesthetics
- biological resources
- paleontological resources
- geology and soils
- hazards and hazardous materials
- hydrology and water quality
- public service systems
- utilities and service systems
- recreation

Table II-1, Summary of Impacts and Mitigation Measures from the Initial Study (pp. 8-14), shows recommended mitigation measures as they relate to each environmental topic. For a complete description of the potential impacts and recommended mitigation measures, please refer to the specific discussion in the Initial Study, included as Appendix B to this EIR.

2. Potential Areas of Controversy

Letters and verbal testimony (from the December 5, 2008 scoping session) received as comments on the Notice of Preparation (NOP) raised a number of potential areas of controversy, including: hydrology, water quality, and storm drainage; traffic congestion, access to public transit; safety hazards due to the proximity of the railroad tracks; visual impacts; and land use. The NOP and written comments are included in Appendix A of this EIR.

3. Significant Impacts

Under CEQA, a significant impact on the environment is defined as, "…a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project, including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance."[1] Implementation of the proposed project has the potential to result in adverse environmental impacts in several environmental areas. Impacts in the following areas would be significant without the implementation of mitigation measures, but would be reduced to a less-than-significant level if the mitigation measures noted in this report are implemented:

- transportation, circulation and parking
- cultural resources
- air quality
- global climate change
- noise

[1] Remy, Thomas, Moose, and Manley, *Guide to the California Environmental Quality Act*, 2007, p.184; Public Resources Code 15382; Public Resources Code 21068.

4. Cumulative Impacts

Implementation of the DTSP would result in a cumulatively considerable contribution to traffic congestion at the Main Street/Empire Avenue and Cypress Road intersections. In addition, if Option #2 of the Main Street Realignment (Main Street/Main Street Bypass/O'Hara Avenue Roundabout) is implemented by the City, traffic congestion at the new intersection would result in a cumulatively considerable significant unavoidable impact.

5. Significant Unavoidable Impacts

As discussed in Section IV.A, Cultural Resources, demolition of historic architectural resources both as a result of the Main Street Realignment and development/redevelopment of Opportunity Sites would result in a significant unavoidable impact both to the individual resources and to the Oakley Old Town Historic District as a whole. In addition, as discussed in Section IV.B, Transportation, Circulation and Parking, if Option #2 for the east end of the Main Street Realignment is implemented, traffic congestion at the Main Street/Main Street Bypass/O'Hara Avenue roundabout would result in a cumulatively considerable significant unavoidable impact in the cumulative plus project condition.

6. Alternatives to the Proposed Project

The three alternatives to the proposed project analyzed in Chapter V of this EIR are summarized below. These alternatives (with the exception of the CEQA-mandated No Project alternative) were intended to achieve the key objectives of the project while reducing or avoiding significant and less-than-significant environmental effects.

- The **No Project alternative** assumes that no future development activities or private investment would occur within the boundaries of the DTSP area, and that existing conditions would continue.
- The **Reduced Density alternative** considers the impacts of development that would result from a 20 percent reduction in commercial and residential development proposed by the DTSP. Up to 288,000 square feet of new commercial uses and 240 residential units would be constructed under this alternative.
- The **No Main Street Realignment alternative** considers the impacts of the proposed DTSP without implementation of the Main Street Realignment. It is assumed that Main Street would be widened along its current alignment to accommodate existing and future through traffic.

The Reduced Density alternative is identified as the environmentally superior alternative. Each of the alternatives is discussed in detail in Chapter V of this EIR.

C. SUMMARY TABLES

As previously discussed, Table II-1 shows recommended mitigation measures as they relate to each environmental topic in the Initial Study. Information in Table II-2, Summary of Impacts and Mitigation Measures in the EIR, (pp. 15-28) summarizes the impacts and mitigation measures discussed in Chapter IV of the EIR. Tables II-1 and II-2 are arranged in four columns: (1) impacts; (2) level of significance without mitigation; (3) mitigation measures; and (4) level of significance after mitigation. Levels of significance are categorized as follows: SU = Significant and Unavoidable; S = Significant; and LTS = Less Than Significant. For a complete description of potential impacts and recommended mitigation measures, please refer to the specific discussion in Chapter III.

Table II-1: Summary of Impacts and Mitigation Measures from the Initial Study

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
I. AESTHETICS			
Impacts to day and nighttime views.	S	AES-1: For each project developed under the DTSP, the Community Development Department shall review lighting plans to ensure that lighting is low-intensity and downward-directed and does not create a substantial source of light or glare.	LTS
IV. BIOLOGICAL RESOURCES			
Impacts to Swainson's hawk.	S	BIO-1: Prior to site preparation activities on Redevelopment Opportunity Sites 4 and 6 and the open undeveloped area at the southeast corner of the DTSP area along Rose Avenue, Mitigation Measures identified in the East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan for the burrowing owl and Swainson's hawk, including planning surveys and, if required, preconstruction surveys followed by Avoidance and Minimization and Construction Monitoring, shall be implemented, as appropriate.	LTS
V. CULTURAL RESOURCES			
Impacts to paleontological resources.	S	PALEO-1: Should any paleontological resources be uncovered during grading, excavation, or construction activities associated with implementation of the DTSP, these activities shall be diverted to a part of the of the site away from the find and a certified paleontologist shall be contacted by the contractor to: 1) ascertain the significance of the resource; 2) establish a protocol with the City to protect such a resources (including methods for documentation and preservation); 3) ascertain the presence of additional resources; and 4) provide additional monitoring of the site if the City deems it appropriate.	LTS
VI. GEOLOGY AND SOILS			
Impacts related to seismic hazards.	S	GEO-1: Prior to approval of new development projects or projects which substantially modify existing structures within the DTSP, a geologic and engineering study shall be completed to: 1) define and delineate potentially hazardous geologic and/or soils conditions; 2) recommend means of mitigating these adverse conditions; and 3) provide implementation of these recommendations. The study shall be consistent with the City of Oakley General Plan liquefaction policies (Policy 8.1.9).	LTS

Table II-1 *Continued*

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
VII. HAZARDS AND HAZARDOUS MATERIALS			
Impacts related to potential hazardous materials release.	S	HAZ-1a: As a condition of approval for any permit for demolition, excavation or grading of a parcel within the DTSP area, a Phase I site assessment shall be conducted by a qualified professional (e.g., a California-registered environmental assessor) to identify current or historical land uses that have or may have included the storage or generation of hazardous materials and the potential for releases of hazardous materials to have occurred that might impact the site. The assessments shall be performed in conformance with standards adopted by the American Society for Testing and Materials International in Method E1527-05 (ASTM Standard) for Phase I site assessments.	LTS
		HAZ-1b: If a Phase I site assessment indicates that a release of hazardous materials could have affected the site, additional soil and/or groundwater investigations shall be conducted by a qualified environmental professional to assess the presence and extent of contamination at the site. These investigations shall be conducted in conformance with State and local guidelines and regulations.	
		HAZ-1c: For any site where contamination has been identified, construction shall only occur in accordance with a site-specific health and safety plan prepared by a certified industrial hygienist. The plan shall include provisions for monitoring exposure to construction workers, delineate procedures to be undertaken in the event that contamination is identified above action levels, and identify emergency procedures and responsible personnel. If construction were to take place on sites adjacent to residences or other areas with sensitive receptors, the health and safety plan shall include air monitoring at the perimeter of the construction site. The health and safety plan shall include performance standards identified to minimize the effects of airborne contaminants (for example, stopping work in dusty conditions, limiting excavation areas, or wetting down of surfaces). Construction workers at contaminated sites shall be required to have received hazardous materials training in accordance with Federal and State regulations.	

Table II-1 *Continued*

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
Impacts related to asbestos or lead-based paint exposure.	S	HAZ-2: As a condition of approval for any demolition or permit for a structure known or suspected to have been constructed prior to 1980, an asbestos and lead-based paint survey shall be performed. If asbestos-containing materials are determined to be present, the materials shall be abated by a certified asbestos abatement contractor in accordance with the regulations and notification requirements of the Bay Area Air Quality Management District. If lead-based paint is identified, then federal and State construction worker health and safety regulations shall be followed during renovation or demolition activities. If loose or peeling lead-based paint is identified, it shall be removed by a qualified lead abatement contractor and disposed of in accordance with existing hazardous waste regulations.	LTS
Conflicts with an adopted emergency response plan or emergency evacuation plan.	S	HAZ-3a: Prior to approval of projects associated with the DTSP, the East County Fire Protection District, Oakley Public Works Department and the Oakley Police Department shall review and approve project design to ensure that the project does not impair implementation or physically interfere with emergency plans.	LTS
		HAZ-3b: Improvement plans for roadways constructed within the DTSP site shall be reviewed by the City of Oakley Planning Department and Public Works and Engineering Department to ensure that adequate width and turning radius is maintained on all roadways.	
VIII. HYDROLOGY AND WATER QUALITY			
Construction-period water quality impacts.	S	HYD-1: For projects that disturb 10,000 square feet or more, the project applicant shall prepare a Storm Water Pollution Prevention Plan (SWPPP) designed to reduce potential impacts to surface water quality through the construction-period of the project. It is not required that the SWPPP be submitted to the RWQCB, but must be maintained on-site and made available to RWQCB staff upon request. The SWPPP shall be submitted to the Community Development Department prior to approval of the grading plan. The SWPPP shall include:	LTS

Table II-1 *Continued*

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
HYD-1 *Continued*		• *Best Management Practices.* Specific and detailed Best Management Practices (BMPs) shall be designed to mitigate construction-related pollutants to a level of insignificance. At a minimum, BMPs shall include practices to minimize the contact of construction materials, equipment, and maintenance supplies (e.g., fuels, lubricants, paints, solvents, adhesives) with stormwater. The SWPPP shall specify properly designed centralized storage areas that keep these materials out of the rain. • *Framework for Education*. An important component of the storm water quality protection effort is knowledge of the site supervisors and workers. To educate on-site personnel and maintain awareness of the importance of stormwater quality protection, site supervisors shall conduct regular tailgate meetings to discuss pollution prevention. The frequency of the meetings and required personnel attendance list shall be specified in the SWPPP. • *Monitoring Plan.* The SWPPP shall specify a monitoring program to be implemented by the construction site supervisor, and must include both dry and wet weather inspections. In addition, in accordance with State Water Resources Control Board Resolution No. 2001-046, monitoring would be required during the construction period for pollutants that may be present in the runoff that are “not visually detectable in runoff.” RWQCB personnel, who may make unannounced site inspections, are empowered to levy considerable fines if it is determined that the SWPPP has not been properly prepared and implemented. • *Soil Erosion.* Soil erosion BMPs designed to reduce erosion of exposed soil may include, but are not limited to soil stabilization controls, watering for dust control, perimeter silt fences, placement of hay bales, and sediment basins. The potential for erosion is generally increased if grading is performed during the rainy season as disturbed soil can be exposed to rainfall and storm runoff. If grading must be conducted during the rainy season, the primary BMPs selected shall focus on erosion control, that is, keeping sediment on the site. End-of-pipe	

Table II-1 *Continued*

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
HYD-1 *Continued*		sediment control measures (e.g., basins and traps) shall be used only as secondary measures. If hydroseeding is selected as the primary soil stabilization method, then these areas shall be seeded by September 1 and irrigated as necessary to ensure that adequate root development has occurred prior to October 1. Entry and egress from the construction site shall be carefully controlled to minimize off-site tracking of sediment. Vehicle and equipment wash-down facilities shall be provided and designed to be accessible and functional during both dry and wet conditions.	
Operation-period water quality impacts.	S	HYD-2a: Consistent with City of Oakley Municipal Code, the project applicant for each project developed under the DTSP that creates 10,000 square feet of new, additional or replacement impervious area, including street and roadway projects, shall submit a Stormwater Control Plan to the Community Development Department, along with the development application. Design characteristics, landscape features, and Best Management Practices (BMPs) identified in the Stormwater Control Plan should minimize impervious surfaces, retain and detain stormwater, slow runoff rates, and reduce the discharge of pollutants to the *maximum extent practicable* and should be designed to treat 80 percent of average annual runoff, consistent with NPDES permit provision C.3.d. The plan should be prepared simultaneously with the preliminary site plan and landscaping plan and considered by the Community Development Department as part of the project application. The plan should be certified by a qualified architect, landscape architect, or civil engineer. Implementation of the Stormwater Control Plan shall be a condition of approval for the project. Prior to issuance of a Certificate of Occupancy, the project applicant shall submit a detailed Stormwater Control Operation and Maintenance Plan to the Building Department.	LTS

Table II-1 *Continued*

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
HYD-2 *Continued*		HYD-2b: In addition to requirements for treatment measures listed above, the project applicant for each project that creates one or more acres of impervious surface shall demonstrate compliance with flow-control requirements such that post-project runoff does not exceed estimated pre-project rates or durations. The project applicant must demonstrate compliance with Contra Costa County's Hydrograph Modification Management Plan (HMP) using one of four options described in the County's Stormwater C.3 Guidebook.	
Impacts associated with the placement of structures in the 100-year flood zone.	S	HYD-3: Consistent with City of Oakley Standard Conditions of Approval, the project applicant for any project area located in the 100-year floodplain shall submit a Letter of Map Revision application or the appropriate application to the Federal Emergency Management Agency (FEMA) to remove the building pads that are currently within the Special Flood Hazard Area Zone A from the flood zone. FEMA must issue no less than a Conditional Letter of Map Revision prior to the City issuing building permits for the lots affected by the Zone A designation. The applicant should be aware of the requirements of the Federal Flood Insurance Program and the City Floodplain Management Ordinance as they pertain to future construction of any structures on this property.	LTS
XIII. PUBLIC SERVICES			
Impacts associated with inadequate fire protection.	S	PUB-1: Prior to issuance of a building permit for buildings greater than two stories in height, the Community Development Department shall receive confirmation from the East County Fire Protection District that the District has adequate equipment to serve the proposed project or that the specific building design otherwise provides a safe environment in the event of a severe earthquake or fire.	LTS
XVI. UTILITIES AND INFRASTRUCTURE			
Impacts associated with inadequate sewer infrastructure capacity.	S	UTL-1a: Specific development projects proposed under the DTSP shall demonstrate adequate sewerline capacity and integrity to serve the project. Sewer lines that are substandard shall be replaced, consistent with the Ironhouse Sanitary District standards. The City shall coordinate line replacement with the District and the project applicant shall pay for their fair share of improvements.	LTS

Table II-1 *Continued*

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
UTL-1 *Continued*		UTL-1b: Additionally, the General Plan policy and programs from the Wastewater Services section of the Growth Management Element listed below would reduce this potential impact. • Policy 4.9.4: Reduce the need for sewer system improvements by requiring new development to incorporate water conservation measures, which reduce flows into the sanitary sewer system. • Program 4.9.A: Require new development to pay its fair share of the cost of on- and off-site infrastructure. This shall include installation of necessary public facilities, payment of impact fees, and participation in a Capital Improvement Program. • Program 4.9.D: At the project approval stage, require new development to demonstrate that wastewater treatment capacity can be provided. The City shall obtain assurance that 1) capacity exists within the wastewater treatment system if a development project is built within a set period of time, or 2) capacity will be provided by a funded program or other mechanism. This finding will be based on information furnished or made available to the City from consultations with the Ironhouse Sanitation District, the applicant, or other sources.	

Source: LSA Associates, Inc., 2009.

Table II-2: Summary of Impacts and Mitigation Measures from the EIR

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
A. CULTURAL RESOURCES			
CULT-1: The Main Street Realignment component of the DTSP would result in the demolition of six existing historical architectural resources, resulting in a substantial adverse change to the historical significance of select structures themselves, as well as to the Oakley Old Town Historic District as a whole.	S	CULT-1: Prior to their demolition or relocation, historical structures that would be affected by the Main Street Realignment shall be properly documented. The documentation shall, at a minimum, consist of a report documenting the historical context with descriptive narrative of the resource, and an update of the resource's Department of Parks and Recreation form 523 record. The photo-documentation shall capture the form, materials, design, and setting of the buildings to preserve those characteristics that justify their California Register eligibility both individually and as part of the Oakley Old Town Historic District. If building relocation is pursued, the photo-documentation shall include views of the resources in their new locations, with an emphasis on the context and architectural setting of their new surroundings. The photo-documentation shall be prepared in concert with a historical context statement and narrative description of each building to place each property in its architectural and historical context. The documentation package shall be distributed to the NWIC, the Contra Costa County Historical Society, the City of Oakley, the Oakley Chamber of Commerce, and, for the purposes of public outreach, the Oakley Public Library.	SU
CULT-2: Ground disturbance in the form of site preparation, building demolition, construction, and subsurface utility construction or other ground disturbance may result in a significant impact to unrecorded historical or archaeological resources, including human remains.	S	CULT-2a: If recorded archaeological deposits are discovered during project activities, all work within 25 feet of the discovery shall be redirected. At that time, a qualified archaeologist shall: (1) evaluate the discovery to determine if it meets the definition of a historical or archaeological resource; and (2) make recommendations regarding the disposition of the discovery. If the discovery does not meet the definition of a historical or archaeological resource, then no further study or protection would be necessary prior to project reinitiation. If the discovery does meet the definition of a historical or archaeological resource, it shall be avoided by project activities. If avoidance is not feasible, adverse effects to such resources shall be mitigated in accordance with the	LTS

Table II-2 *Continued*

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
CULT-2 *Continued*		recommendations of the evaluating archaeologist. These recommendations may include but are not limited to: excavation and data recovery, site recordation, and appropriate curation of the recovered materials using accepted methods and techniques. Project personnel shall not collect or move any archaeological material. Fill soils that may be used for construction purposes should not contain archaeological materials. Upon completion of the archaeological evaluation, a report documenting the methods, results, and recommendations of the archaeologist should be prepared and submitted to the City of Oakley and the NWIC.	
		CULT-2b: If human remains are encountered, work within 25 feet of the discovery shall be redirected and the County Coroner notified immediately. At the same time, an archaeologist should be contacted to assess the situation. Project personnel shall not collect or move any human remains or associated materials. If the human remains are of Native American origin, the Coroner must notify the Native American Heritage Commission within 24 hours of this identification. The Native American Heritage Commission will identify a Native American Most Likely Descendant (MLD) to inspect the site and provide recommendations for the proper treatment of the remains and associated grave goods. Upon completion of the assessment, the archaeologist shall prepare a report documenting the methods and results, and provide recommendations regarding the treatment of the human remains and any associated cultural materials, as appropriate and in coordination with the recommendations of the MLD. The report shall be submitted to the City of Oakley and the NWIC.	

Table II-2 *Continued*

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
CULT-3: Facade improvements to buildings that qualify as historical resources may result in a loss of historical significance to those resources	S	CULT-3a: The City shall ensure that improvements and/or alterations follow the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings* (Secretary's Standards). Pursuant to CEQA Guidelines §15064.5(b)(3), if the improvements and/or alterations are undertaken in a manner consistent with the Secretary's Standards, then potential impacts to historical resources will generally be considered mitigated to a less-than-significant level. If improvements and/or alterations cannot be undertaken in a manner consistent with the Secretary's Standards, then Mitigation Measure CULT-3b shall be implemented.	LTS
		CULT-3b: Improvements and/or alterations to buildings identified as historical resources shall be developed in consultation with a qualified architectural historian. The purpose of the consultation is to (1) identify character-defining features of the subject buildings that should not be altered by the improvements; and, in the case of conflicts between plan objectives and historical values, (2) recommend approaches to lessen an undesirable loss of historical integrity by using alternative materials and compatible designs. The City shall ensure that the feasible recommendations of the architectural historian are implemented. If the recommendations cannot be feasibly implemented, the building's pre- and post-alteration condition shall be photo-documented, and its Department of Parks and Recreation form 523 record shall be updated to reflect the changes, and be submitted to the NWIC and the City of Oakley. Implementation of this measure will reduce this impact to a less-than-significant level.	
CULT-4: Development of DTSP Opportunity Sites may result in the development of new commercial or office uses that may (1) demolish or substantially alter historical resources; and/or (2) introduce new development that adversely alters the setting of historical resources.	S	CULT-4a: If a development opportunity site contains a historical resource (either individually significant or significant as part of the District) and the resource will be integrated into the redevelopment, then Mitigation Measures CULT-3a and -3b shall be implemented. Implementation of either measure would reduce this impact to a less-than-significant level.	SU

Table II-2 *Continued*

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
CULT-4 *Continued*		CULT-4b: If a development opportunity site is adjacent to a historical resource or within the boundary of the District, then the design for the new construction shall take into account potential adverse impacts to the significance of adjacent resources and their setting. The project applicant for individual projects shall ensure that prospective designs are developed in consultation with a qualified architectural historian. The purpose of the consultation shall be to (1) identify proposed design elements that will result in a significant alteration of the setting of nearby resources; and (2) recommend design changes to lessen the undesirable loss of integrity of setting with respect to exterior treatments, massing, and building setbacks. The City shall ensure that the feasible design recommendations of the architectural historian are implemented in the executed building design. If the recommendations cannot be feasibly implemented, then the City shall require individual project applicants to fund photo-documentation of the pre- and post-construction setting of the opportunity site and to update the Department of Parks and Recreation form 523 records for adjacent resources (or, if applicable, the District) to reflect the changes.	
B. TRANSPORATION, CIRCULATION AND PARKING			
TRANS-1: The addition of traffic generated by the proposed DTSP would cause the signalized Main Street/Empire Avenue intersection (Intersection #2) to operate at unacceptable LOS F during the PM peak hour under Cumulative Plus Project conditions.	S	TRANS-1: The following measures shall be implemented to reduce potential impacts to the Main Street/Empire Avenue intersection: • Add a second exclusive left-turn lane on the westbound approach of the intersection; • Convert the exclusive southbound right-turn lane at the Oakley Road/Empire Avenue intersection to a shared through/right-turn lane; and • Coordinate 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 the intersections of Main Street/Empire Avenue and Oakley Road/Empire Avenue is not included in any funding documents. Individual projects developed as part of the DTSP shall contribute to this mitigation by paying their 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.	LTS

Table II-2 *Continued*

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
TRANS-1 *Continued*		The Main Street/Empire Avenue intersection would operate at LOS D (v/c = 0.90) based on the CCTALOS method and LOS D (delay = 50 seconds) based on the HCM method during the PM peak hour with implementation of these measures.	
TRANS-2: The addition of traffic generated by the proposed DTSP at West Cypress Road/O'Hara Avenue (Intersection #8) intersection would contribute to the unacceptable LOS F conditions during the PM peak hour under Cumulative Plus Project conditions.	S	TRANS-2: Traffic signals shall be installed at the West Cypress Road/O'Hara Avenue intersection. The forecasted AM peak hour and PM peak hour intersection volumes would satisfy the MUTCD peak hour traffic signal warrants. This signal installation is included in the City's Transportation Impact Fee Program. Projects developed as part of the DTSP shall contribute to this mitigation by paying their fair share of the cost through the payment of the City's Transportation Impact Fee. In addition, the forecast analysis shall 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 shall 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 shall 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. The West Cypress Road/O'Hara Avenue intersection would operate at LOS B (v/c = 0.67) based on the CCTALOS method and LOS C (delay = 31 seconds) based on the HCM method during the PM peak hour with implementation of Mitigation Measure TRANS-2.	LTS
TRANS-3: The proposed roundabout at the Main Street/Main Street Bypass/O'Hara Avenue intersection under Option #2 would operate at unacceptable LOS F conditions during the PM peak hour under Cumulative Plus Project conditions.	S	TRANS-3: Mitigation of unacceptable conditions at the Main Street/Main Street Bypass/O'Hara Avenue intersection can be achieved by selecting either Option #1 or Option #3. If Option #2 is selected, the impact would remain significant and unavoidable.	SU
TRANS-4: The design of the specific development projects and roadways developed under the DTSP may result in increased hazards due to a design feature, inadequate emergency access, or conflicts with adopted alternative transportation policies, plans, or programs.	S	TRANS-4: The City Engineer shall review and approve of the final design plans for specific development projects and roadways to ensure the adequacy of the design. The following items shall be reviewed as part of each individual development plan as the Plan Area continues to develop:	LTS

Table II-2 *Continued*

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
TRANS-4 *Continued*		• The number of driveways on the Main Street Bypass shall be minimized. These driveways shall be limited to right-in/right-out movements only. • The interim improvements on Main Street, prior to the completion of the Main Street Bypass, shall be reviewed to ensure that Main Street will continue to accommodate heavy trucks. • The currently signalized Main Street/Vintage Parkway and Main Street/ O'Hara Avenue intersections shall be converted to all-way stop-controlled intersections after the completion of the Main Street Bypass. • The design of Main Street, east of the Main Street Bypass shall be reconsidered to better accommodate trucks and bicycles. It is recommended that the proposed parking lane on the south side of the roadway be eliminated to widen the outside travel lanes. • The design of Plan Area roadways shall be coordinated with Tri-Delta Transit to determine the location for bus pullouts and bus shelters on Main Street and to provide pedestrian access between the bus stops and the major destinations in the Plan Area. • Roadways within the Plan Area shall provide adequate width and turning radii for emergency access vehicles. • Development projects within the Plan Area shall be evaluated and approved only if they provide adequate emergency access. • Development projects within the Plan Area shall be evaluated and approved only if they provide adequate truck access and circulation. • To the extent feasible, non-residential parking shall be accessible to all users and not reserved for specific development projects. • The incremental parking demand for each development project shall be estimated and compared to the overall parking supply to ensure adequate parking supply in the Plan Area. • Bicycle parking shall be evaluated and development projects approved only if they provide adequate bicycle parking facilities throughout the Plan Area.	

Table II-2 *Continued*

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
C. AIR QUALITY			
AIR-1: Construction period activities could generate significant dust, exhaust and organic emissions.	S	AIR-1: Consistent with guidance from the BAAQMD and General Plan Program OSC-6.2.B, the following actions shall be required of all construction contracts and specifications for individual development projects constructed within the DTSP area: *Demolition.* The following controls shall be implemented during demolition: • Water during demolition work, including the break-up of pavement and infrastructure, to control dust generation; • Cover all trucks hauling demolition debris from the site; and • Use dust-proof chutes to load debris into trucks whenever feasible. *Construction.* The following controls shall be implemented at all construction sites: • 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 to control dust; • Cover all trucks hauling soil, sand, and other loose materials and require liners for truck beds; • 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 (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 (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.);	LTS

Table II-2 *Continued*

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
AIR-1 *Continued*		• Diesel equipment standing idle for more than 5 minutes shall be turned off. This would include trucks waiting to deliver or receive soil, aggregate, or other bulk materials. Rotating drum concrete trucks may keep their engines running continuously as long as they are on a construction site; • Properly tune and maintain equipment to reduce emissions; • Avoid staging equipment within 200 feet of residences. • 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; • Any temporary haul roads to soil stockpile areas shall be routed away from existing neighboring land uses. • Water sprays shall be utilized to control dust when material is being added or removed from stockpiles. When stockpiles are undisturbed for more than one week, storage piles shall be treated with a dust suppressant or crusting agent to eliminate wind-blown dust generation. • Install baserock at entryways for all exiting trucks, and wash off the tires or tracks of all trucks and equipment in designated areas before leaving the site; and • Suspend excavation and grading activity when winds (instantaneous gusts) exceed 25 mph.	

Table II-2 *Continued*

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
D. GLOBAL CLIMATE CHANGE			
GCC-1: Implementation of the DTSP may conflict with applicable plans, policies and regulations of other agencies to the degree that GHG reduction goals may not be met.	S	GCC-1: To the extent feasible and to the satisfaction of the City, the following measures shall be incorporated into the design and construction of the projects seeking City approval and developed as part of the DTSP: ***Energy Efficiency Measures*** • Design all project buildings to exceed California Building Code's Title 24 energy standard, including, but not limited to any combination of the following: o Increase insulation such that heat transfer and thermal bridging is minimized; o Limit air leakage through the structure or within the heating and cooling distribution system to minimize energy consumption; and • Design buildings to facilitate use of solar energy for electricity, water heating and/or space heating/cooling; • Provide a landscape and development plan for the project that takes advantage of shade, prevailing winds, and landscaping; • Install efficient lighting and lighting control systems. Use daylight as an integral part of lighting systems in buildings; • Install light colored "cool" roofs and cool pavements; • Install energy efficient heating and cooling systems, appliances and equipment, and control systems; and • Install energy-efficient, solar or light emitting diodes (LEDs) for outdoor lighting, as appropriate. ***Water Conservation and Efficiency Measures*** • Create water-efficient landscapes within the DTSP area, including drought tolerant landscaping; • Install water-efficient irrigation systems and devices, such as soil moisture-based irrigation controls;	LTS

Table II-2 *Continued*

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
GCC-1 *Continued*		• Design buildings to be water-efficient. Install water-efficient fixtures and appliances, including low-flow faucets, dual-flush toilets and waterless urinals; and • Restrict watering methods (e.g., prohibit systems that apply water to non-vegetated surfaces) and control runoff. ***Transportation and Motor Vehicle Measures*** • Provide transit facilities (e.g., bus bulbs/turnouts, benches, shelters); • Provide bicycle lanes and/or paths, incorporated into the proposed street systems and connected to a community-wide network; and • Provide sidewalks and/or paths, connected to adjacent land uses, transit stops, and/or community-wide network.	
GCC-2: Implementation of the DTSP may significantly increase the consumption of energy resources.	S	GCC-2: Projects developed as part of the DTSP shall implement the energy efficiency measures listed in Mitigation Measure GCC-1.	LTS
E. NOISE			
NOISE-1: Construction noise related to buildout of the DTSP would generate exterior noise exceeding normally acceptable levels for noise sensitive land uses in the DTSP area.	S	NOISE-1: All construction projects within the DTSP area shall comply with the following construction noise reduction measures: • During all project site excavation and on-site grading, the project contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers consistent with manufacturers' standards. All heavy construction equipment used on project sites within the DTSP area shall be maintained in good operating condition, with all internal combustion, engine-driven equipment equipped with intake and exhaust mufflers that are in good condition. "Quiet" models of air compressors and other stationary noise sources shall be utilized where such technology exists. • The construction contractors shall place all stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest individual project sites. The construction contractors shall also locate equipment staging in areas as far away as possible from noise-sensitive receptors nearest individual project sites within the DTSP area during all project construction.	LTS

Table II-2 *Continued*

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
NOISE-1 *Continued*		• The construction contractors shall post signs prohibiting unnecessary idling of internal combustion engines. The contractors shall further designate a “noise disturbance coordinator” who would be responsible for responding to any local complaints about construction noise. The disturbance coordinator would determine the cause of the noise complaints (e.g. beginning work too early, bad muffler) and institute reasonable measures warranted to correct the problem. A telephone number for the disturbance coordinator shall be conspicuously posted at all construction sites within the DTSP area. • Consistent with the City's noise ordinance of the Municipal Code, all noise-producing construction related activities shall be limited to the hours of 7:30 a.m. to 7:00 p.m. weekdays and 9:00 a.m. to 7:00 p.m. on weekends and holidays.	
NOISE-2: Local traffic and railroad operations would generate long-term exterior noise exceeding normally acceptable levels for proposed sensitive land use development in the DTSP area.	S	NOISE-2a: All development projects proposed under the DTSP that would be exposed to noise levels in excess of the City’s standards for the maximum allowable noise exposure levels from transportation sources, shown in Tables 9-3 and 9-1 of the General Plan (Tables IV.E-6 and IV-E-7 of the EIR), shall demonstrate compliance with General Plan Policies 9.2.1 and 9.2.2, as follows: • *General Plan Policy 9.2.1*: New development of noise-sensitive land uses shall not be permitted in areas exposed to existing or projected levels of noise from transportation noise sources which exceed the levels specified in Table 9-3 (see EIR Table IV.E-6, Maximum Allowable Noise Exposure From Transportation Noise Sources), unless the project design includes effective mitigation measures to reduce exterior noise and noise levels in interior spaces to the levels specified in Table 9-3 (see EIR Table IV.E-6, Maximum Allowable Noise Exposure From Transportation Noise Sources).	LTS

Table II-2 *Continued*

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
NOISE-2 *Continued*		• *General Plan Policy 9.2.2*: Where noise-sensitive land uses are proposed in areas exposed to existing or projected exterior noise levels exceeding the levels specified in Table 9-3 (see EIR Table IV.E-6, Maximum Allowable Noise Exposure From Transportation Noise Sources) or the performance standards of Table 9-1 (see EIR Table IV.E-7, Noise Level Performance Standards for New Projects Affected by or Including Non-Transportation Noise Sources), an acoustical analysis shall be required as part of the environmental review process so that noise mitigation may be included in the project design. Demonstration of compliance with the above General Plan policies shall be submitted to the Community Development Director prior to issuance of building permits. Mitigation measures may include, but are not limited to, installation of air conditioning systems to allow windows to remain closed for extended periods of time, upgraded window or wall assemblies to reduce exterior to interior noise transmission, or setback requirements to reduce transportation related noise impacts on noise sensitive land uses.	
		NOISE-2b: All roadway projects proposed under the DTSP that could lead to increased noise levels shall demonstrate compliance with General Plan Policy 9.1.5, as follows: • *General Plan Policy 9.1.5:* Noise created by new transportation noise sources shall be mitigated so as not to exceed the levels specified in Table 9-3 (see EIR Table IV.E-6, Maximum Allowable Noise Exposure From Transportation Noise Sources) at outdoor activity areas or interior spaces of existing noise-sensitive land uses. Demonstration of compliance with General Plan Policy 9.1.5 shall be submitted to the Community Development Director prior to project approval. Mitigation measures may include, but are not limited to, traffic calming measures, sound walls, or setback requirements to reduce transportation related traffic noise impacts on noise sensitive land uses.	

Table II-2 *Continued*

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
NOISE-3: Buildout of the DTSP could include stationary noise sources that would generate long-term exterior noise exceeding normally acceptable levels for noise sensitive land uses in the DTSP area.	S	All projects proposed under the DTSP shall demonstrate compliance with General Plan Policies 9.1.2, 9.1.3, and 9.1.4, as follows: • *General Plan Policy 9.1.2:* New development of noise-sensitive uses shall not be allowed where the noise level due to non-transportation noise sources will exceed the noise level standards of Table 9-1 (see EIR Table IV.E-7, Noise Level Performance Standards for New Projects Affected by or Including Non-Transportation Noise Sources) as measured immediately within the property line or within a designated space outdoor activity area (location is at the discretion of the Community Development Director) of the new development, unless effective mitigation measures have been incorporated into the development design to achieve the standards specified in Table 9-1 (see EIR Table IV.E-7, Noise Level Performance Standards for New Projects Affected by or Including Non-Transportation Noise Sources). • *General Plan Policy 9.1.3:* Noise created by new proposed non-transportation noise sources shall be mitigated so as not to exceed the noise level standards of Table 9-1 (see EIR Table IV.E-7, Noise Level Performance Standards for New Projects Affected by or Including Non-Transportation Noise Sources) as measured immediately within the property line of lands designated for noise-sensitive uses. • *General Plan* Policy 9.1.4: Where non-residential land uses are likely to produce noise levels exceeding the performance standards of Table 9-1 (see EIR Table IV.E-7, Noise Level Performance Standards for New Projects Affected by or Including Non-Transportation Noise Sources) at existing or planned noise-sensitive uses, an acoustical analysis shall be required as part of the environmental review process so that noise mitigation may be included in the project design. The requirements for the contents of an acoustical analysis are given in Table 9-2 (see EIR Table IV.E-7, Noise Level Performance Standards for New Projects Affected by or Including Non-Transportation Noise Sources).	LTS

Table II-2 *Continued*

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
NOISE-3 *Continued*		Demonstration of compliance shall be submitted to the Community Development Director prior to issuance of building permits. Mitigation measures may include, but are not limited to, installation of air conditioning systems to allow windows to remain closed for extended periods of time, upgraded window or wall assemblies to reduce exterior to interior noise transmission, or setback requirements to reduce stationary noise impacts on noise sensitive land uses.	
NOISE-4: Development related to buildout of the DTSP could expose sensitive receptors to railroad-related groundborne vibration levels exceeding normally acceptable levels for noise sensitive land uses.	S	NOISE-4: All projects proposed under the DTSP that would be located within 200 feet of the railroad tracks centerline shall submit an acoustical study detailing ground borne vibration and noise level impacts and the measures that would be incorporated into the project to reduce the identified impacts to meet the Federal Transit Administration's impact criteria standards. Such analysis shall be submitted for review and approval to the Community Development Director prior to issuance of building permits.	LTS

Source: LSA Associates, Inc., 2009.

III. PROJECT DESCRIPTION

This chapter describes the City of Oakley Downtown Specific Plan (DTSP), which is being evaluated in this program EIR. As stipulated by *CEQA Guidelines* Section 15124, the project description that follows provides details about the plan to the extent needed for adequate evaluation of environmental impacts. This chapter includes: (a) the location and boundaries of the proposed project area (also referred to as the "DTSP area" or "site"); (b) the planning and regulatory context; (c) an overview of the plan including the plan goals and objectives; (d) the plan implementation strategies and actions; (e) a description of the plan's regulatory tools and development regulations; and (f) the approvals required to adopt these various components and implement the project.

A. DOWNTOWN SPECIFIC PLAN AREA

This section describes the project site's location, Plan Area boundaries, surrounding land uses, and site characteristics.

1. Location

The City of Oakley is located in the northeast corner of Contra Costa County. Oakley is located along the southern shore of the Sacramento-San Joaquin Delta, south of the San Joaquin River and northeast of the Diablo Mountain Range. As shown in Figure III-1, Oakley is bordered by the City of Antioch to the west, unincorporated Contra Costa County including the Town of Knightsen to the east, and the City of Brentwood to the south. Sacramento is approximately 58 miles to the northeast. San Jose is approximately 70 miles to the south. San Francisco is approximately 50 miles to the southwest.

Downtown Oakley is located near the geographical center of the City. State Route 4 (Highway 4) is the major east-west arterial for the surrounding region and for the City. It extends through the center of the DTSP site as Main Street. Highway 4 provides access to the area from U.S. Highway 680 (I-680) to the west and from U.S. Interstate 5 (I-5) to the east. State Route 160 and the Senator John Nejedly Bridge provide access to the area from across the San Joaquin River to the north.

2. Plan Area Boundaries

The DTSP site encompasses approximately 80 acres. As shown in Figure III-2, the Burlington Northern Santa Fe (BNSF) Railroad line forms the northern plan boundary, from immediately east of Miguel Drive on the west to the Contra Costa Canal on the east. The southern boundary is generally formed by Home Street between the Contra Costa Canal and Norcross Lane and just north of Ruby Street between Norcross Lane and Gardenia Avenue. The historical "Downtown Core" is generally located between Third Street and Hall Street and extends south to Ruby Street.

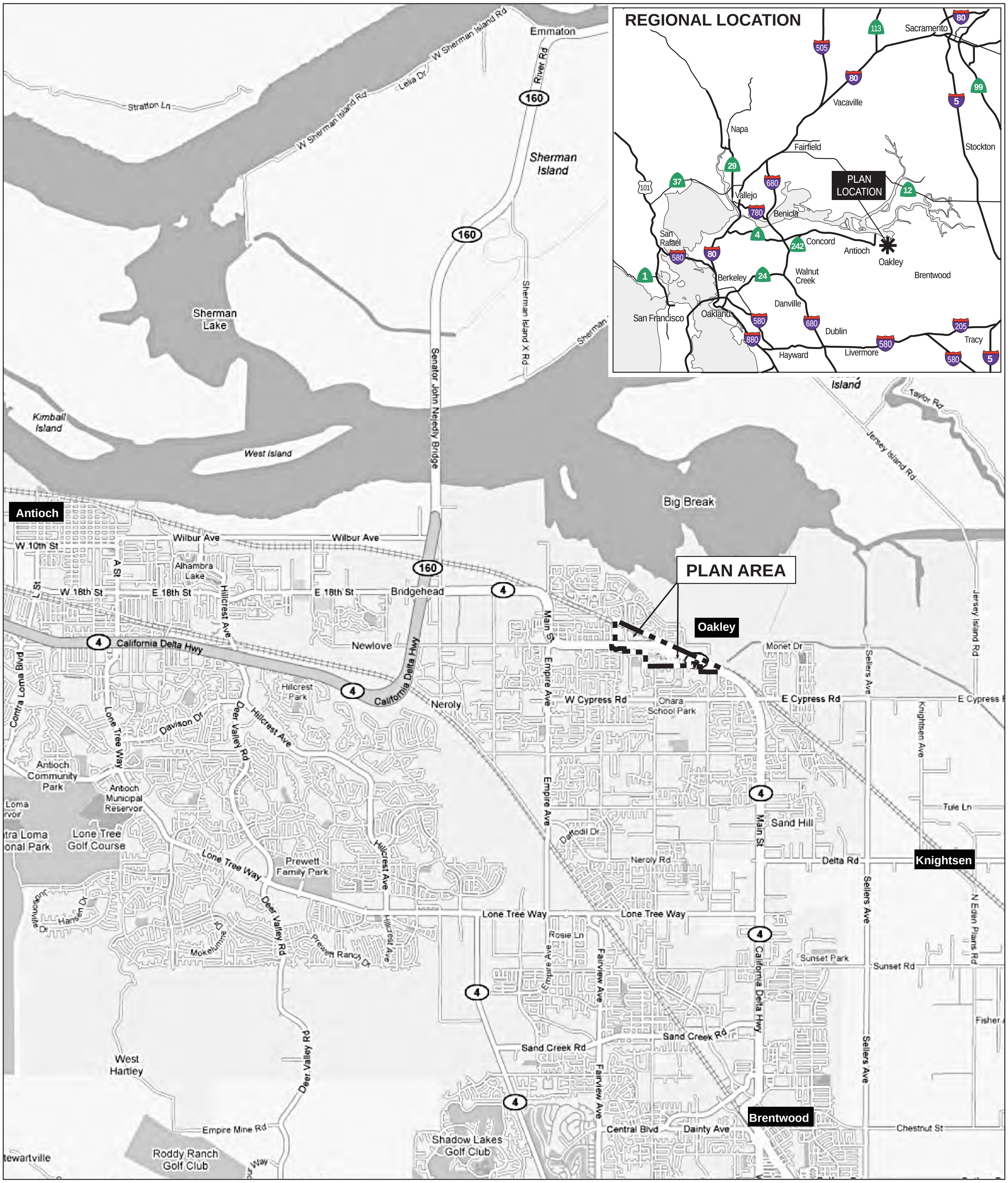

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FIGURE III-1

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PLAN AREA BOUNDARY

Oakley Downtown Specific Plan EIR

Regional Location

SOURCE: GOOGLE MAPS, 2008.

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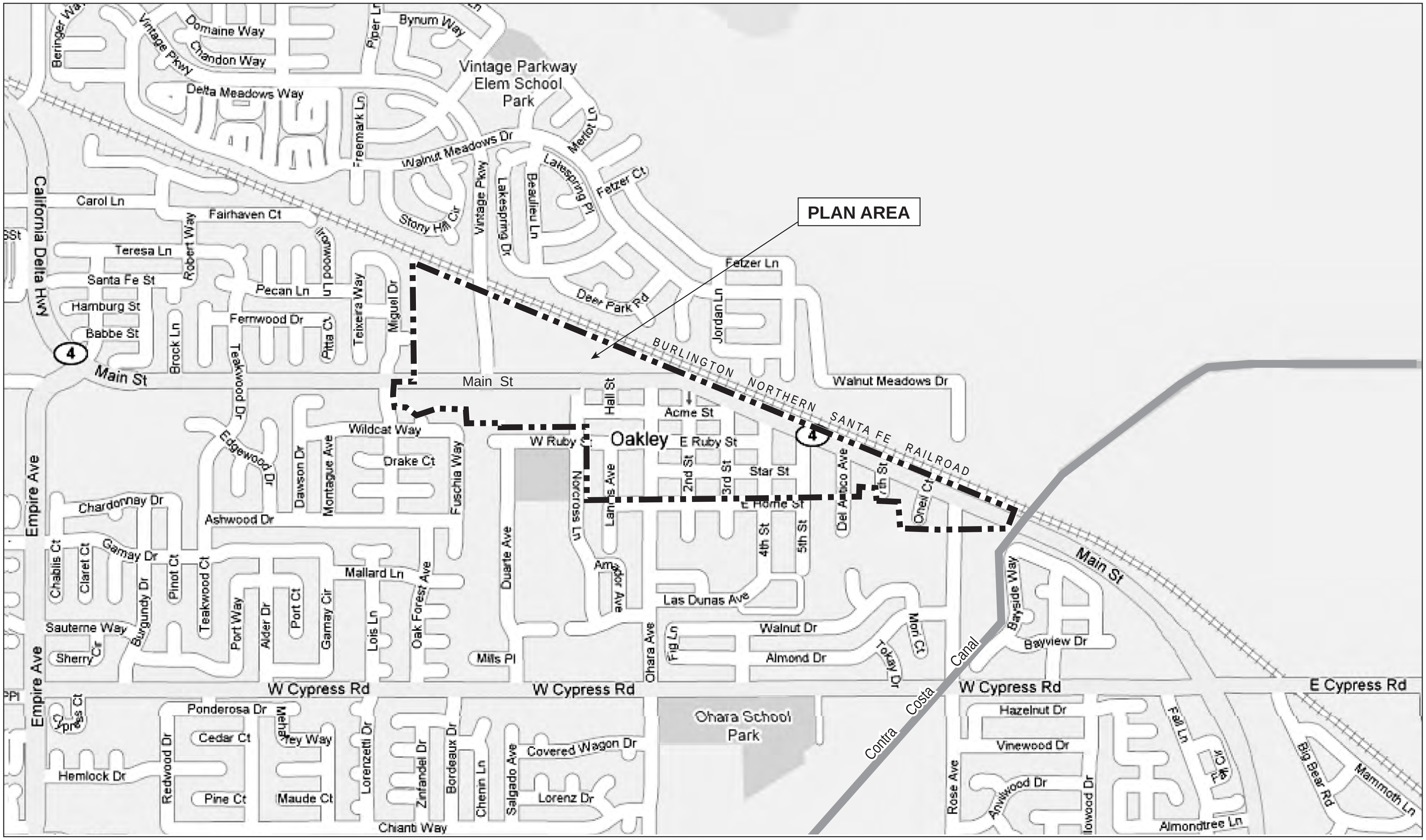

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FIGURE III-2

Oakley Downtown Specific Plan EIR

Project Vicinity

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PLAN AREA BOUNDARY

SOURCE: GOOGLE MAPS, 2006.

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3. General Characteristics

This subsection describes the land use, general plan and zoning designations, and roadway characteristics for the DTSP area.

a. Land Use. Downtown Oakley's existing land use and development ranges from traditional older storefront commercial buildings to small-scale highway commercial development, light industrial, and auto services. Figure III-3 provides an aerial view of the DTSP site and its surroundings. Vacant lots make up nearly 40 percent, or approximately 30 acres, of the plan area. Land uses to the north, west and south of the DTSP area are primarily single-family residential. In general, residential areas to the south are older, and those to the west and north, across the BNSF railroad line, are newer. Commercial uses are generally located towards the east along Main Street and a significant number of vacant or underutilized properties are located along/north of Main Street.

The Oakley Civic Center is located within the DTSP site, east of Vintage Parkway and south of Main Street. The Civic Center is the site of City Hall, as well as the Police Department, City Council Chambers, an outdoor amphitheatre and park. The Black Bear Restaurant is located west of the Civic Center.

b. General Plan Land Use Designations and Zoning. The majority of the parcels within the DTSP area are designated as Commercial Downtown by the Oakley General Plan. Other General Plan land use designations within the plan area include: Single Family Residential-High Density designated south of Ruby Street and west of Fourth Street; Public and Semi-Public uses; and Multi-Family Residential-Low Density. Surrounding land uses include residential, commercial and public and semi-public land uses. Parcels along the northerly frontage of East Main Street are designated Light Industrial.

The General Plan designates special planning areas throughout the City. The majority of the DTSP area located south of Main Street falls within the Downtown Mixed-Use Special Planning Area identified within the General Plan Special Planning Areas Map. Additionally, the majority of the DTSP area is located within the Redevelopment Area designated within the General Plan.[1]

The DTSP area is currently zoned with the following zoning districts: Mixed Use Area (MU); Commercial (CO); Multiple Family Residential-Low Density (ML); Single Family Residential-High Density (SH); Public/Semi Public (PS); and Light Industrial (LI).

c. Roadways. Main Street, which is approximately 4,800 linear feet in length within the DTSP site, serves as the focus of the DTSP. Main Street is a primarily two-lane roadway within the Downtown, with one lane in each direction and a shared center turn lane. Main Street is a four-lane roadway outside of the Downtown Core, east of Rose Avenue and west of Vintage Parkway.

There are three main intersections on Main Street in the Downtown. Two of these intersections are signalized – at Vintage Parkway and at O'Hara Avenue. Vintage Parkway is a collector street that extends north over the BNSF rail line to a primarily residential neighborhood and it is the only street in the immediate area of Downtown that provides access across the rail line. O'Hara Avenue is a

[1] Oakley, City of, 2002. Oakley 2020 General Plan. Chapter 2: Land Use Element. Figure 2-1 and 2-3.

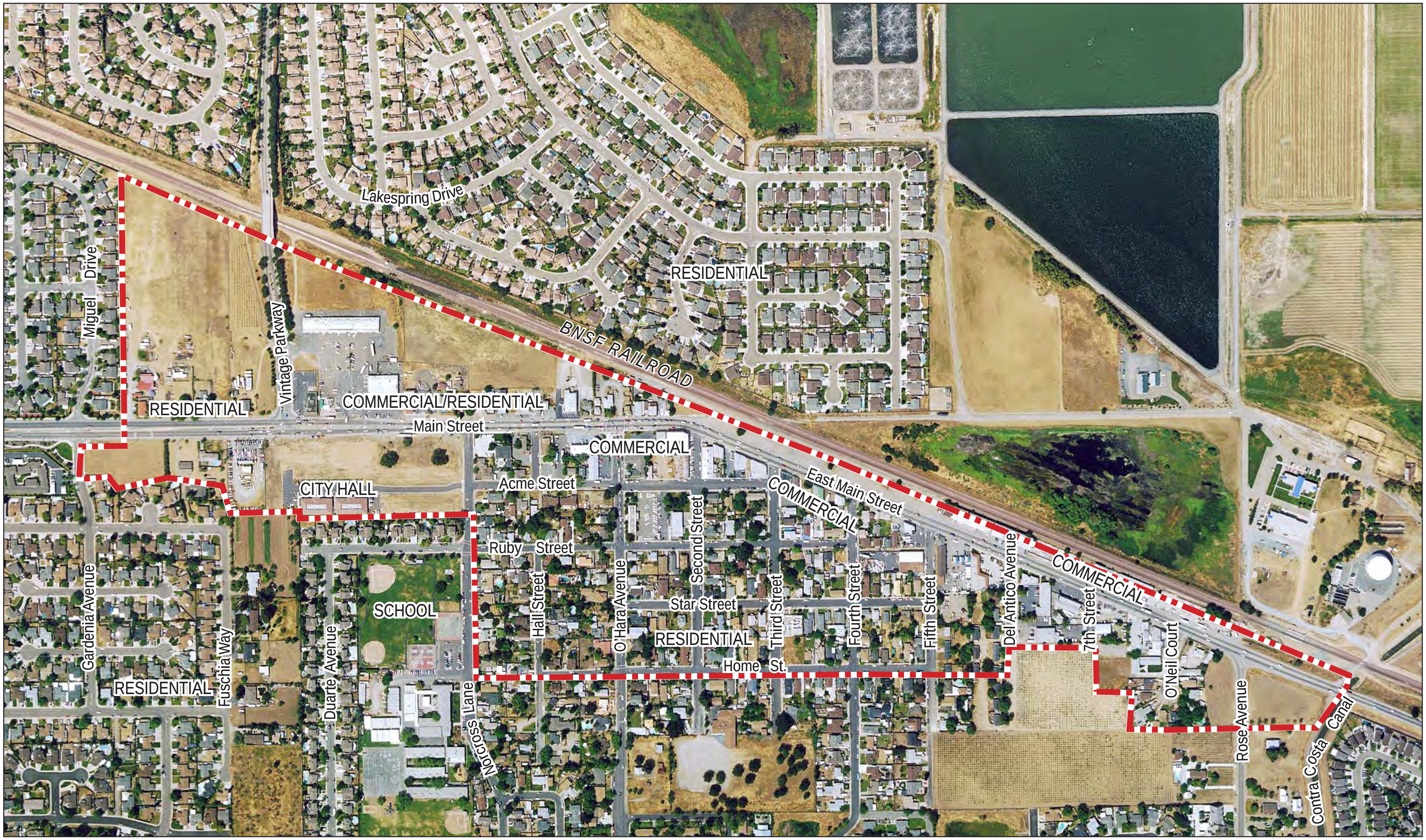

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FIGURE III-3

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LEGEND

PLAN AREA BOUNDARY

Oakley Downtown Specific Plan EIR

Existing Land Uses

SOURCE: GLOBEXPLORER, MAY 2006.

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Back of III-3

collector street that extends to residential and commercial areas to the south of Downtown and continues south to the City of Brentwood. Norcross Lane provides local access south of Main Street.

B. PLANNING AND REGULATORY CONTEXT

This section describes the background of the DTSP, the State regulatory context for specific plans, the relationship of the DTSP to the General Plan and Zoning Ordinance, and the regulating agencies with jurisdiction over Main Street within the DTSP area.

1. Background

Oakley is located within the "Route 4 Corridor," one of the fastest growing areas in the Bay Area and in the State of California. Between 1990 and 2000 Oakley's population increased by approximately 40 percent, from 18,000 to 25,000 persons. The Oakley 2020 General Plan estimates that at build out, the City including potential municipal expansion areas, would have a total population of 66,968 persons.[2]

The majority of the City's growth has occurred outside the Downtown, and therefore, the Downtown area has not received significant investment in recent years. Many properties are vacant or under-utilized, resulting in the gradual deterioration in the building stock. A haphazard mix of land uses exists along Main Street and, combined with heavy truck and auto traffic and a lack of pedestrian amenities, Downtown Oakley has not been a competitive environment for the types of specialty shops, restaurants, and related businesses that make up a thriving downtown commercial district.

Prior to incorporation, the Contra Costa County Board of Supervisors adopted a Redevelopment Plan for Oakley in 1989. The Redevelopment Plan was designed to provide a means to address and finance needed transportation improvements, upgrades to community facilities, and revitalization of older residential and commercial areas. In 1992, the Contra Costa County Redevelopment Agency initiated formal discussions with the Oakley community regarding the Downtown area, referred to as Old Town. These discussions led to a planning effort to address future Realignment of Main Street and reinvestment in the Downtown area. Contra Costa County adopted the Old Town Oakley Specific Plan and EIR in 1996.[3] Contra Costa County also adopted the Oakley Redevelopment Area Planned Unit District in May 1999.[4]

The City of Oakley incorporated in July 1999 and began developing policies and programs to guide the new city. The Oakley 2020 General Plan was adopted in 2002 and it contains numerous policies that focus on revitalization of the Downtown area. An update to the Old Town Oakley Specific Plan, the Downtown Design & Development Plan, was drafted under the direction of the Oakley Downtown Task Force in 2005. Although the Downtown Design & Development Plan was never adopted, it served as the basis for the majority of the policies and regulations contained in the DTSP.

[2] Oakley, City of, 2002. Oakley 2020 General Plan. Chapter 10: Housing Element. Pg. 10-2.

[3] Cannon Design Group, 1996. Oakley Old Town Specific Plan, Contra Costa County. Mills Associates, 1996. Environmental Impact Report for the Oakley Old Town Specific Plan and Related Implementation Measures. SCH No. 94073043. February.

[4] Oakley, City of 1999. Oakley Redevelopment Area Planned Unit District. May 18.

The DTSP would implement the Oakley 2020 General Plan policies for the Downtown and compiles downtown revitalization strategy recommendations, clarifies revitalization objectives, and defines the programs and capital improvements that the City and the Redevelopment Agency will pursue in coming years to realize the community's Downtown vision. The DTSP also serves as an update to the Oakley Old Town Specific Plan and the zoning provisions of the Oakley Redevelopment Area Planned Unit District.

2. California Law Authorizing Specific Plans

A specific plan is a planning and regulatory tool available to local governments in the State of California. Under State law (Government Code Section 65450 et. seq.), cities and counties may use a specific plan as a method to implement the municipal general plan in a particular geographic area. Government Code Section 65451 requires specific plans to include text and diagrams covering: distribution, location, and extent of land uses within the specific plan area; proposed distribution, location, extent, and intensity of infrastructural facilities proposed for the plan area; standards and criteria by which development will proceed; an implementation program for the specific plan; and a discussion outlining the relationship of the specific plan to the general plan.

3. Relationship to General Plan and Zoning Ordinance

Under the legal authorization set by Article 8 of the State of California Government Code (Sections 65450 - 65457), the Specific Plan, upon adoption, shall become the primary means of regulating and directing land use planning and development within the DTSP site. The types of land uses designated for the area by the DTSP are consistent with the General Plan land use designations for the area and no amendment to the General Plan is required for adoption of the DTSP.

To ensure consistency between the DTSP and the City of Oakley Zoning Ordinance, the Zoning Ordinance would be amended to create the Downtown Specific Plan (DSP) District and the DTSP area would be rezoned to this DSP District. Section E., Required City Approvals, below describes City approvals required to implement the DTSP.

Any aspects of new development or redevelopment not covered in the DTSP will be subject to the regulations of the Oakley Municipal Code including the zoning regulations. Additionally, in those instances where there are conflicts between existing regulations and the DTSP, the Specific Plan regulations and policies will prevail. Wherever the DTSP does not provide policy guidance, the goals, policies and objectives of the City's General Plan will apply.

4. State Route 4 Bypass and Main Street Ownership

In 1989 the State Route 4 Bypass Authority, a joint powers agency consisting of the cities of Antioch, Brentwood, Oakley and Contra Costa County, formed to construct a SR 4 Bypass intended to ease traffic congestion in Brentwood and Oakley and to provide access to the growing areas of southeast Antioch and western Brentwood. The SR 4 Bypass is located in the cities of Antioch and Brentwood and in unincorporated portions of Contra Costa County and would replace the portion of Highway 4 that currently passes through Downtown Oakley. The SR 4 Bypass will connect to SR 4 from just south of the Main Street Interchange in Antioch to the existing intersection with Marsh Creek Road south of Brentwood. The Bypass is scheduled for completion in the fall of 2009.

Currently, SR 4, including the portion referred to as Main Street that passes through Downtown Oakley, is owned and operated by the State of California and improvements or maintenance of the roadway must be accomplished under a permit issued by the California Department of Transportation (Caltrans). It is anticipated that the California Transportation Commission will adopt the SR 4 Bypass and transfer the State's ownership of Main Street to the City of Oakley. At that time, Main Street would become a local roadway owned and operated by the City. The Main Street Realignment and Main Street Improvements envisioned by the DTSP would require Caltrans approval in the event that they are constructed prior to the relinquishment of Caltrans ownership.

C. DOWNTOWN SPECIFIC PLAN OVERVIEW

The four primary elements of the DTSP intended to achieve a cohesive, inviting, and lively pedestrian environment are:

- A land use and revitalization strategy that identifies key Redevelopment Opportunity Sites;
- Roadway capital improvement projects for Main Street and other Downtown streets as well as the Main Street Realignment;
- Implementation actions and efforts needed to accomplish the plan objectives; and
- Design and development standards and guidelines to shape streetscape improvements, façade improvements, and new development throughout the DTSP area.

The DTSP's land use and revitalization strategy envisions the redevelopment of eight key Redevelopment Opportunity Sites on vacant or underutilized parcels in the Downtown. Continuous storefronts along Main Street and large footprint commercial development along the Main Street Realignment could create up to 360,000 square feet of commercial space. Infill housing on the upper floors and adjacent frontages could provide up to 300 dwelling units.

1. Downtown Specific Plan Goals and Objectives

The DTSP contains goals and objectives to be implemented first through policy changes and then through private and public development efforts.

a. Plan Goals. The DTSP contains four basic goals:

- **Improve Main Street's Overall Appearance**. Improving the appearance of Main Street is essential for attracting the patrons and new investment needed to create the downtown district envisioned. There are two major contributors to the appearance of Main Street – the building frontage and the streetscape. To improve building frontages, the City would continue to work with local merchants and property owners through the Facade Improvement Program to upgrade existing buildings. The Main Street Realignment would allow for additional opportunities to improve the appearance of the existing Main Street, by improving the pedestrian scale and amenities of the street, as described below.
- **Enhance the Pedestrian Environment**. The pedestrian environment consists of building frontages and the street space between. Enhancing it requires improving pedestrian safety and pedestrian amenities, as well as aesthetic improvements to buildings and the streetscape in general. To support a pedestrian-oriented district, visible crosswalks, corner bulb outs, street

furnishings, and sidewalk-directed lighting should be installed throughout Downtown. Given Caltrans highway standards, some of these improvements may have to wait until Caltrans relinquishes ownership of Main Street. Prior to relinquishment of ownership by Caltrans, a number of improvements may be implemented if they qualify for design exceptions and/or special consideration as consistent with Caltrans recently adopted "context sensitive design" policies for urban highways.

- **Facilitate the Main Street Realignment.** The Main Street Realignment is integral to revitalization of Downtown Oakley. As noted above, the Realignment will be a catalyst for investment, giving new life to Main Street by redirecting heavy truck and through traffic around the core Downtown, and creating newly accessible properties that enhance Downtown's ability to attract new development. Coordination between the City of Oakley and Caltrans is essential for the Realignment project to proceed, with efforts including preparation and review of engineering plans and environmental analyses, and identification of feasible funding and financing approaches. In the near term, the City should proceed to implement portions of the Realignment as possible, in order to define new property boundaries and to allow local property owners and the Redevelopment Agency to pursue new development opportunities.
- **Promote Higher Density Infill Development**. Higher density infill development is anticipated to support the Downtown's businesses and capitalize upon the pedestrian oriented environment that is envisioned. Multi-story development is strongly recommended. Within the Downtown Core area, this infill development would be storefront commercial with residential or office space above. Downtown Oakley and adjacent areas are considered to be a good location for multi-unit mixed-use commercial/residential development, with appropriate design and management standards in place to regulate such development.

b. Downtown Specific Plan Objectives. The DTSP contains the following revitalization strategy objectives to promote the plan's goals:

- Implement Main Street improvement projects including installation of new curbs, sidewalks, street trees, streetlights, and other basic amenities to enhance Downtown's image and its ability to attract new businesses.
- Promote property renovation and redevelopment through a Façade Improvement Program that injects life into existing properties.
- Obtain funding and implement the Main Street Realignment.
- Focus pedestrian oriented development Downtown through revitalizing existing uses and encouraging higher density residential development and supporting commercial services.
- Concentrate storefront development within the Downtown Core to create a pedestrian-oriented commercial district, with contiguous storefront buildings concentrated within a walkable area.

2. Downtown Specific Plan Organization

The DTSP is organized into six chapters, as briefly described below.

- ***Chapter I – Plan Background & Overview.*** Summarizes the community's Downtown vision, planning context, existing conditions, the planning process, revitalization goals and project summary.

- ***Chapter II – Land Use & Revitalization Strategy.*** Describes the planned pattern of land use and development of opportunity sites as well as the challenges and opportunities for promoting significant new private sector investment in the downtown.
- ***Chapter III – Capital Improvements.*** Describes the physical improvements recommended for Downtown streets and buildings.
- ***Chapter IV – Infrastructure & Public Services.*** Describes the existing and proposed public services and utilities serving the DTSP area.
- ***Chapter V – Implementation.*** Lists proposed projects, costs, potential funding sources, and describes the administrative application of the DTSP.
- ***Chapter VI – Development Standards and Design Guidelines.*** Provides detailed policies for land use, building form, and site improvements that will be applied as part of the City's development application and review process.
- ***Appendix – Land Use Definitions and Use Allowances.*** Includes land use definitions and a description of permitted uses.

3. Redevelopment Opportunity Sites

Many Downtown properties are underutilized or vacant, and the proposed Main Street Realignment would reconfigure properties and require removal of a number of existing buildings. These conditions offer opportunities to pursue Downtown revitalization objectives and redevelop key opportunity sites. The DTSP contains recommendations for development of sites that exist today (near-term) or will be created by the Main Street Realignment (long-term). Figure III-4 shows the location of these redevelopment opportunity sites. Policy recommendations for the opportunity sites are summarized below. Table III-1 lists the acreage and existing and proposed uses for each opportunity site.

Table III-1: Redevelopment Opportunity Sites

Site	Acreage	Current Use	Proposed Use
Near-Term Opportunity Sites			
1. City Hall/ Civic Center	6.9	City Hall, park and restaurant	Additional governmental/quasi-governmental uses
2. Centro Mart Frontage	2.2	Grocery store, surface parking, 2 restaurants	Ground floor commercial (possibly grocery) and second floor residential/office
3. East Main Street	4.0	Commercial uses; vacant; property owned by BNSF railroad	Commercial development
7/8. Infill Sites	--	Commercial and residential uses	Storefront commercial district
Long-Term Opportunity Sites			
4. Oakley Plaza	3.6	Existing strip commercial, parking and vacant land	"Medium box" commercial
5. Main Street Triangle	1.4	Residential uses; site will be created by the Realignment	Gateway feature and commercial development
6. Vintage Parkway Site	10.7	Primarily vacant; some residential uses	Commercial and/or residential

Source: Oakley, City of and Bottomley Associates Urban Design and Planning, 2009. *City of Oakley Downtown Specific Plan,* June.

Near-Term Opportunity Sites

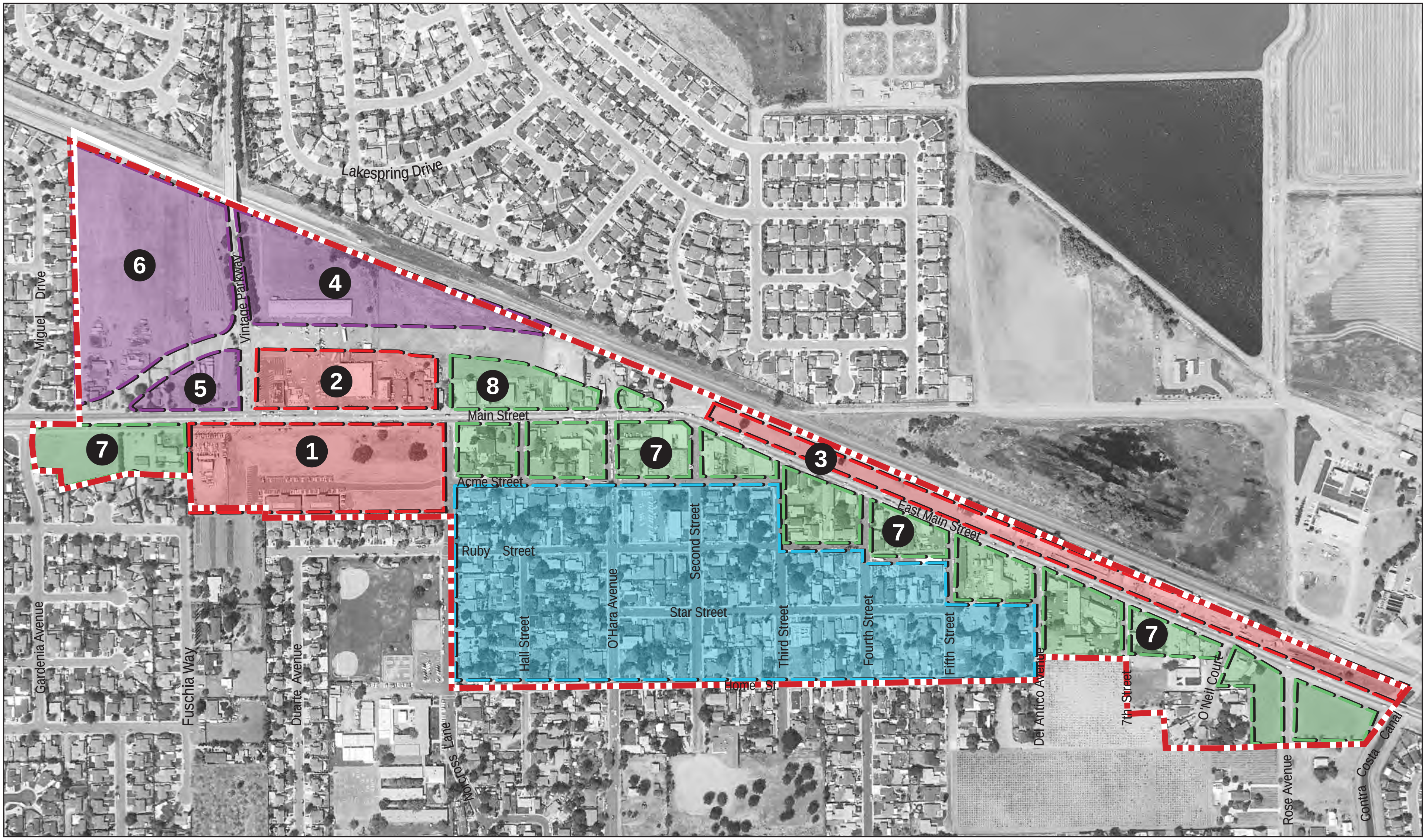
- *City Hall Site (Site 1)*: The City Hall Site is located along the southern frontage of Main Street between Fuschia Way and Norcross Lane. This site serves as an anchor for Downtown and includes the City Hall (completed in 2007), plaza/park, and a restaurant (Black Bear Diner).[5] The commercial frontage on the eastern portion of the site remains to be completed with governmental/quasi-governmental uses.
- *Centro Mart Frontage (Site 2):* Centro Mart Frontage is located along the northern frontage of Main Street between Vintage Parkway and Norcross Lane, across Main Street from City Hall. Centro Mart grocery store, two restaurants and surface parking are currently located on the site. The DTSP envisions redevelopment of this site with storefront commercial space, including a new or renovated Centro Mart and possibly second floor residential or office space.
- *East Main Street (Site 3):* E. Main Street is located along the northeastern frontage of E. Main Street from Second Street to the Contra Costa Canal. The site currently consists of commercial uses and vacant parcels. A portion of the site is owned by the BNSF Railroad Company. The DTSP would promote development of vacant properties and redevelopment of existing ones to improve the appearance of the frontage and support the City's tax base.
- *Infill Development Sites (Sites 7 and 8)*: Infill sites along both sides of Main Street are identified for significant renovation and/or redevelopment to create a storefront commercial district. Existing uses include small commercial and residential buildings. Sites to the south of Main Street generally span from Gardenia Avenue on the west to the Contra Costa Canal on the east. Infill sites north of Main Street span from Norcross Lane to O'Hara Avenue. The DTSP establishes policies for the City and Redevelopment Agency to assist with assembly and redevelopment of these properties and envisions improvements to the street frontage.

Long-Term Opportunity Sites

- *Oakley Plaza (Site 4):* Oakley Plaza is located along the northern frontage of the proposed Realignment between Vintage Parkway and the BNSF railroad tracks. Commercial uses, parking and vacant parcels currently occupy the site. The DTSP encourages development of new medium-box, non-storefront commercial uses (automobile-oriented) along the Realignment.
- *Main Street Triangle (Site 5):* The Main Street Triangle would be created by the Realignment at the western entrance to the Downtown, north of the existing Main Street and south of the proposed Realignment. Residential uses are currently located on the site. The DTSP envisions development of a "gateway" storefront commercial building, with a landmark sign or fountain.

  Vintage Parkway Site (Site 6): The Vintage Parkway site is located north of Main Street and the proposed Realignment, between Miguel Drive and Vintage Parkway. A few residential buildings occupy the site, which is primarily vacant. The DTSP would encourage development of Downtown-supportive commercial or residential development on the site.

[5] Environmental review for the project was completed by the City in the *Initial Study for the Oakley Civic Center*, July 15, 2003.



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LEGEND

NEAR TERM OPPORTUNITY SITES
1 – CITY HALL SITE
2 – CENTRO MART SITE & FRONTAGE
3 – EAST MAIN STREET

LONG TERM OPPORTUNITY SITES
4 – OAKLEY PLAZA SITE
5 – MAIN STREET TRIANGLE
6 – VINTAGE PARKWAY SITE

INFILL DEVELOPMENT SITES
7 – SOUTH SIDE – GARDENIA TO FIFTH
8 – NORTH SIDE – NORCROSS TO O'HARA

POTENTIAL RESIDENTIAL/COMMERCIAL AREA

PLAN AREA BOUNDARY

FIGURE III-4

Oakley Downtown Specific Plan EIR

Redevelopment Opportunity Sites

SOURCE: GLOBEXPLORER, MAY 2006; BOTTOMLEY ASSOCIATES, 2009.

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4. Capital Improvement Projects

The Downtown Specific Plan envisions the construction of seven types of capital improvement projects intended to enhance transportation and safety in the Downtown, support the revitalization strategy, and enhance the Downtown image and pedestrian experience. These projects include the following:

- Main Street Realignment;
- Main Street Frontage and Streetscape;
- East Main Street Widening and Streetscape;
- Downtown Side Street Improvements;
- Infrastructure Projects;
- Building Facade Improvements; and
- Downtown Gateway Signs and Directional Signs.

a. Main Street Realignment. The Main Street Realignment is the primary capital improvement called for by the DTSP. The Realignment would consist of an approximately ½-mile new four-lane northerly bypass of Main Street, from just east of Miguel Drive to just west of Second Street as shown in Figure III-5. The Realignment would carry commuter and through-traffic, while allowing the existing Main Street to be narrowed and become a pedestrian and business-friendly commercial street for Downtown Oakley destinations. The Realignment would likely be constructed in phases, depending on the availability of funding. Phase 1, the highest priority segment, would consist of the middle segment between Vintage Parkway and Norcross Lane. Phase 2 would consist of the segment from Vintage Parkway west to the junction with Main Street and Phase 3 would consist of the segment from Norcross Lane east to the junction with E. Main Street. Figures III-6a, b, and c depict three optional configurations for the eastern segment of the Realignment (Phase 3). The preferred east end alignment would be identified after completion of Phase 2. Each alternative alignment is evaluated in this EIR.

b. Main Street Frontage and Streetscape. The Downtown area currently lacks consistent frontage improvements including curbs, gutters and sidewalks as well as pedestrian amenities. Right-of-way widths and building setbacks are also inconsistent along Main Street. The DTSP envisions streetscape improvements that contribute to an attractive and memorable Downtown. Within the core area, Main Street would be widened to 62 feet curb-to-curb. Curb, gutter, and 12-foot sidewalks along Main Street would be installed where they do not currently exist. Street trees and pedestrian-oriented streetlights would be installed, and street crossings at intersections between Vintage Parkway and Fourth Street would be enhanced. Corner bulb-outs would be constructed where permitted by traffic engineering constraints. Once the Main Street Realignment is completed, additional street improvements would be constructed on Main Street. These improvements include the construction of parallel parking, a bike lane, and installation of a center median.

c. East Main Street Widening and Streetscape. Similar to Main Street, the DTSP envisions a consistent street width and frontage improvements for East Main Street. East Main Street would be widened to 62 feet curb-to-curb, with two lanes of travel in each direction and a landscaped median/left turn lane. Frontage street trees and streetlights, new sidewalks along the north side and renovated frontage sidewalks along the south would be installed where they currently do not exist.

d. Downtown Side Street Improvements. The DTSP recommends improvements for five side streets located within the immediate Downtown core area including Norcross Lane, Hall Street, O'Hara Avenue, Second Street, and Third Street. Norcross Lane and O'Hara Avenue would both connect north of Main Street to the proposed Main Street Realignment and new traffic signals would be installed in conjunction with construction of the Realignment.

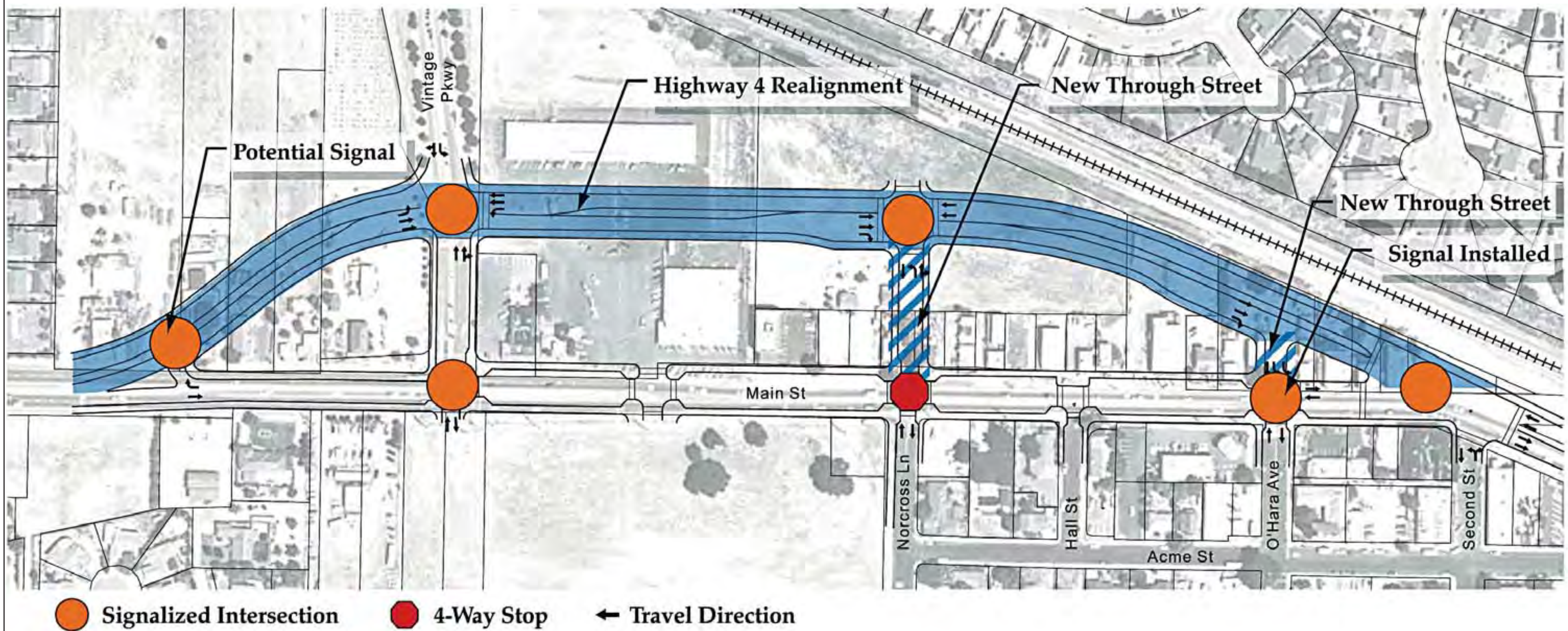
Street trees and pedestrian-oriented streetlights would be installed, and pedestrian street crossings enhanced along Hall Street, O'Hara Avenue, Second Street, and Third Street between Main Street and Acme Street. Interim pavement overlays would be installed along Norcross Lane, Acme Street, Rudy Street, O'Hara Avenue, Home Street, Second Street, Third Street and Fourth Street until the streets could be reconstructed. Angled parking would be retained along the westerly frontage of Second Street between Main Street and Acme Street and would be established along the westerly frontage of Hall Street.

e. Infrastructure Projects. The DTSP describes the following infrastructure improvement projects:

- Construct public parking lots to facilitate public access and pedestrian mobility within the Downtown Area.
- Install a new sanitary sewer system north of Main Street; existing sewer systems are to be replaced with an upsized system to meet future demands in the DTSP area.
- Install supplemental inlets and minor drain lines to convey local drainage to the City-wide drainage system.
- Remove and replace utility poles and overhead lines associated with electrical, telephone, and cable service with underground facilities. The existing 60 kilovolt (kv) lines located along the southerly frontage of Main Street are too costly for undergrounding and are planned to remain.

f. Building Facade Improvements. The City's Façade Improvement Program would be implemented to support revitalization efforts in the Downtown. The program would focus on improvements for storefront commercial facades located east of Second Street along East Main Street, which contribute to the pedestrian-oriented frontages and have architectural features that contribute to Oakley's character. The Façade Improvement Program would also fund minor improvements for buildings to be removed by the Realignment and buildings that will remain but do not contribute to the storefront commercial area.

g. Downtown Gateway Signs and Directional Signs. Gateway areas would be created from "remnant" properties resulting from construction of the Realignment. The western gateway between Vintage Parkway and the Realignment would be developed with a landmark building. The eastern gateway between O'Hara Avenue and the Realignment would be landscaped open space. Signage at



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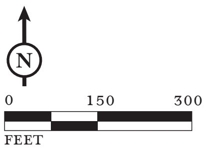

FIGURE III-5

Oakley Downtown Specific Plan EIR

Conceptual Main Street Realignment and Phasing

SOURCE: BOTTOMLEY ASSOCIATES, 2009

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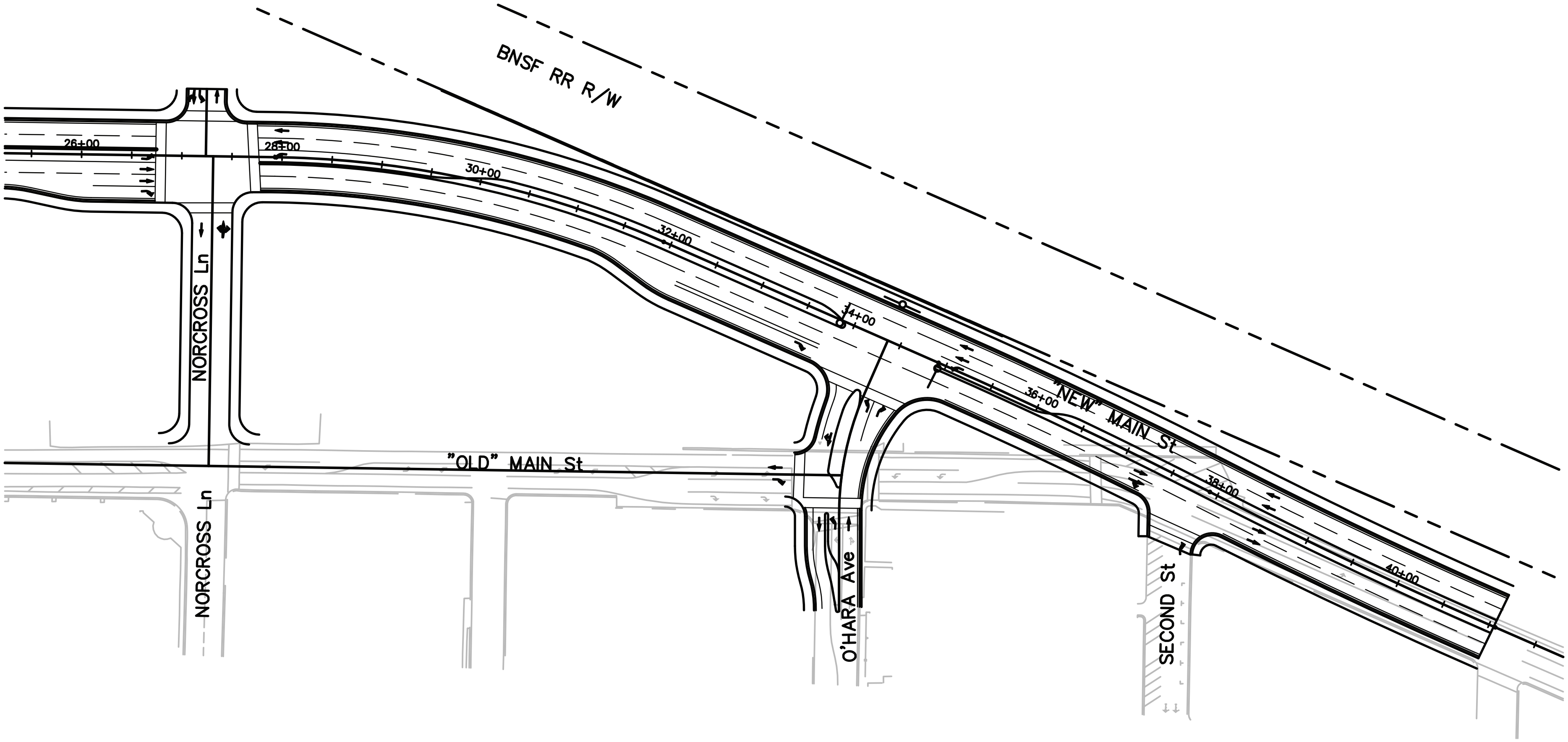

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FIGURE III-6a

Oakley Downtown Specific Plan EIR

East End Main Street Realignment

Option #1

SOURCE: MARK THOMAS & COMPANY, INC., 2009.

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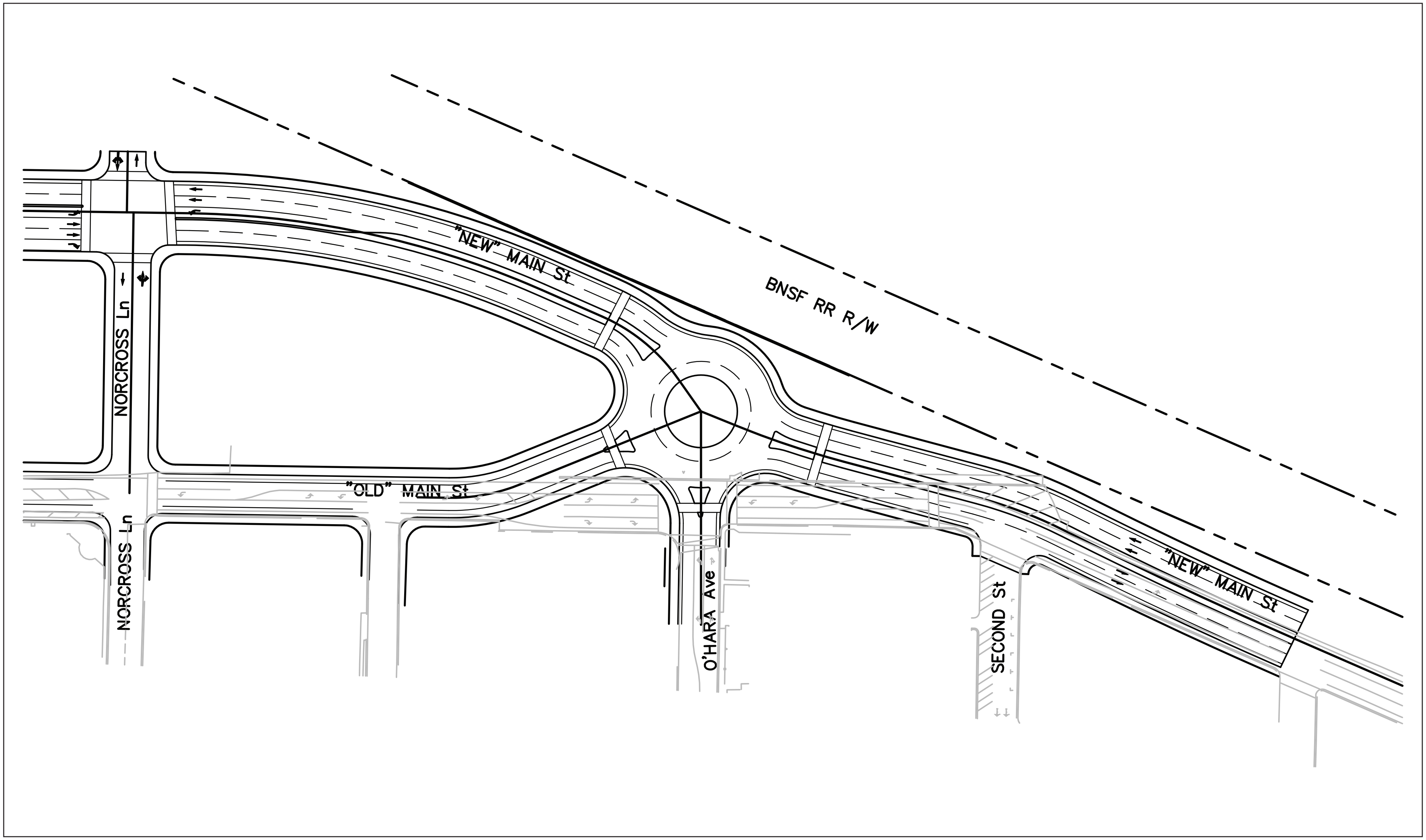

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FIGURE III-6b

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Oakley Downtown Specific Plan EIR
East End Main Street Realignment
Option #2

SOURCE: MARK THOMAS & COMPANY, INC., 2009.

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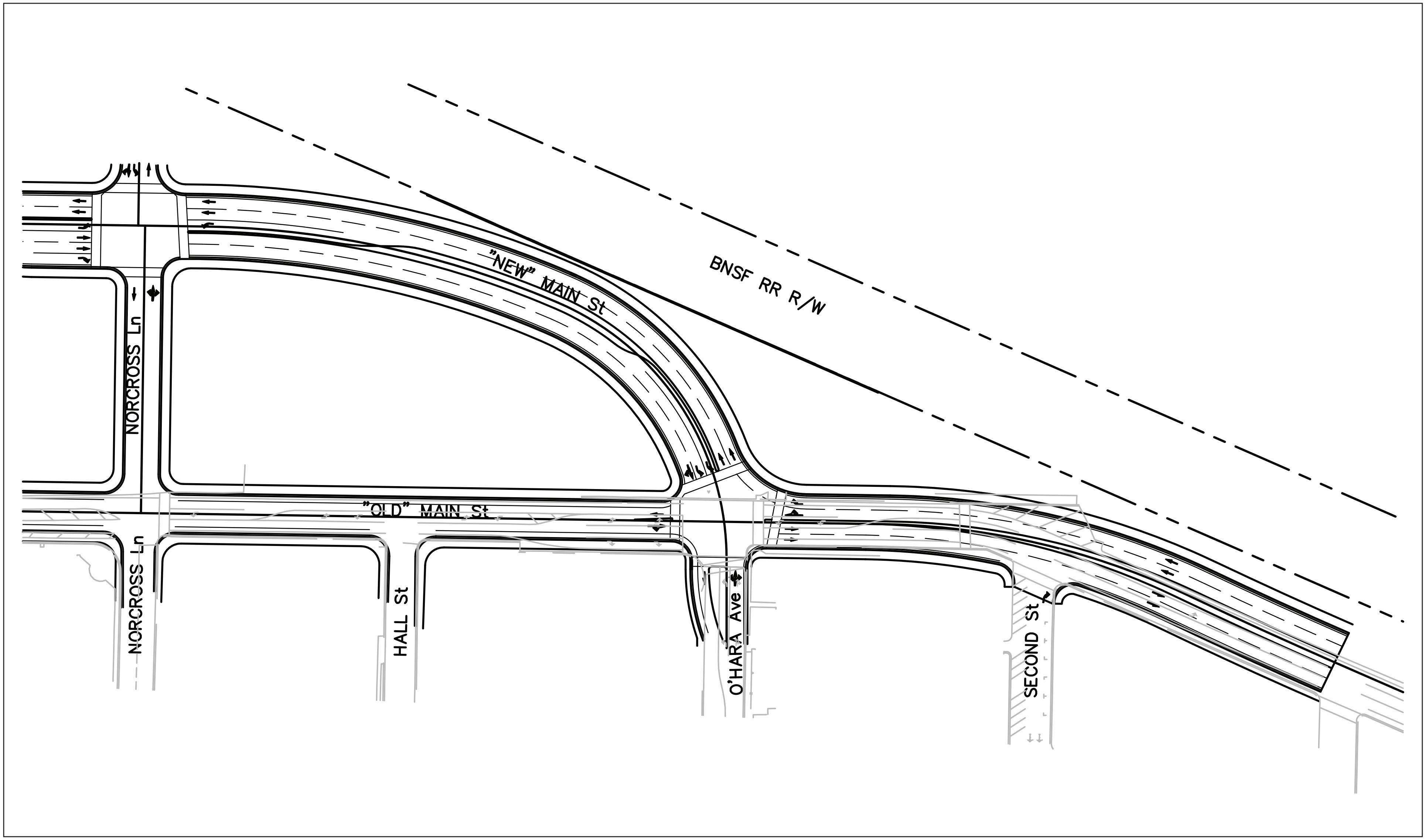

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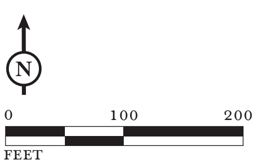
FIGURE III-6c



Oakley Downtown Specific Plan EIR

East End Main Street Realignment

Option #3

SOURCE: MARK THOMAS & COMPANY, INC., 2009.

I:\OKY0601 oakley\figures\Fig_III6c.ai (7/8/09) the gateways would mark the entry to the Downtown. Information and directional signs would also be installed at key intersections and other locations throughout the Downtown Area.

h. Interim City Revitalization Efforts. Interim efforts, which the City can pursue prior to construction of the Main Street Realignment, include policy actions and funding of streetscape and building improvement, as described below.

- Incremental streetscape and building improvements are recommended as major building renovations and/or new development occurs. As funding becomes available, construction of interim streetscape improvements should proceed along Main Street between Vintage Parkway and Fourth Street (see Capital Improvement Projects above).
- Promote redevelopment of sites along the northerly frontage of East Main Street sites, and establish new street plan line(s) as needed in conjunction with this development.
- Promote parcel assembly and mixed-use development in the Downtown Core Area, particularly along the north frontage of Main Street. The City would continue to work with property owners in this area to plan for future development.

D. DOWNTOWN SPECIFIC PLAN DEVELOPMENT REGULATIONS

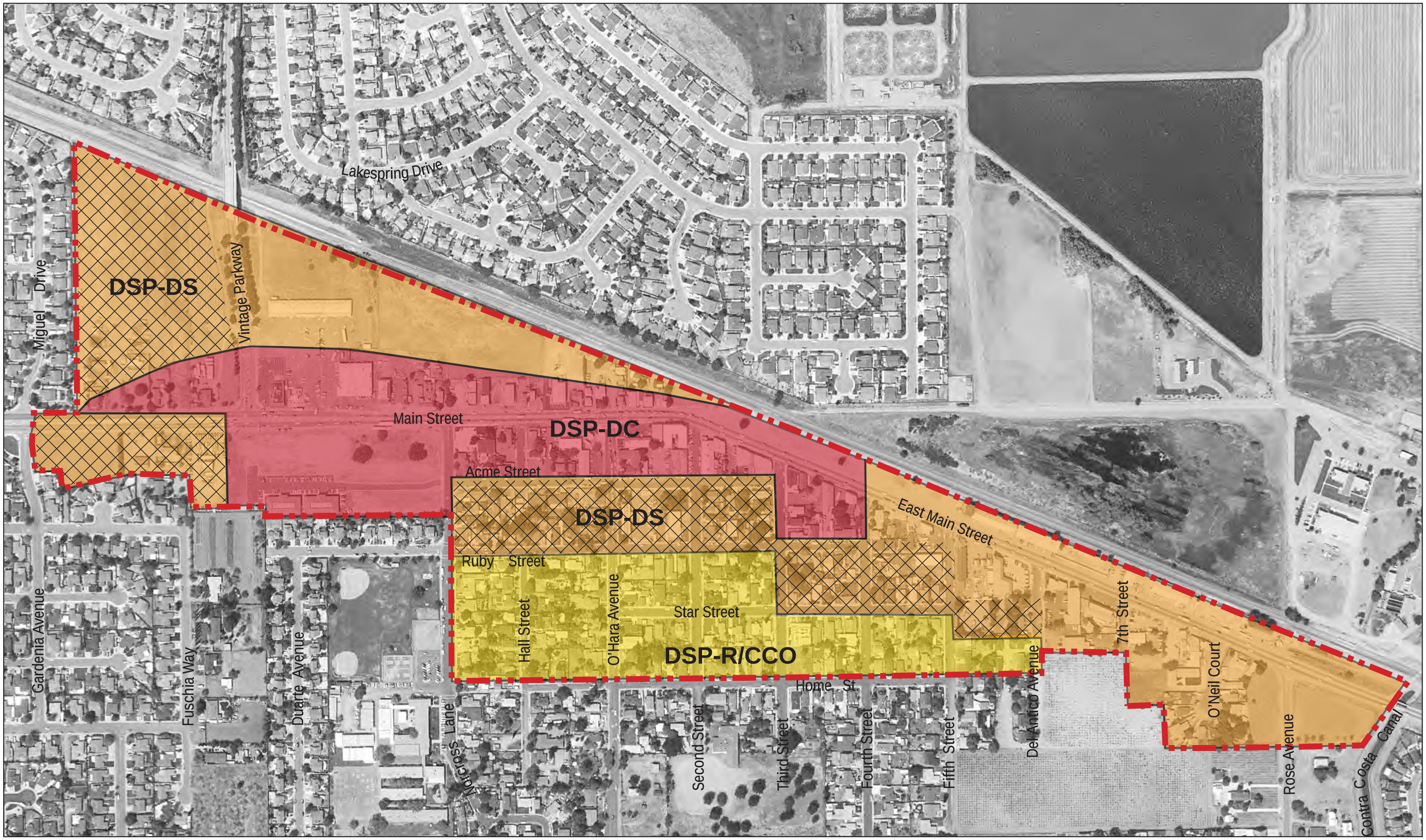
New development standards and design guidelines are proposed to shape investment in the DTSP area. Development standards address aspects of development that are essential for achieving the goals of the DTSP. They are detailed recommendations for land use, building height, setbacks, and parking, and are differentiated to apply to three geographic subareas, or zoning districts. Design guidelines address more subjective aspects of development, such as building form, architectural detailing, and site improvements and landscaping. Guidelines are organized by type of development, e.g., commercial or residential.

1. Development/Zoning Standards

The DTSP site would be rezoned to Downtown Specific Plan (DSP), a new zoning district that would be added to the City's Zoning Ordinance. The DSP Zoning District is divided into three land use districts with development standards that apply to each subarea. As shown in Figure III-7, the Downtown Core Area (DSP-DC) extends along the frontage of Main Street from the western end of the DTSP site to Fourth Street. The Downtown Support Area (DSP-DS) is generally located to the north and south of the Downtown Core Area and extends along E. Main Street from Fourth Street to the Contra Costa Canal. The Residential/Commercial Conversion Opportunity area (DSP-R/CCO) is located south of the Downtown Support area along Home Street, between Norcross Lane and Del Antico Avenue.

The DTSP contains development standards for each of the zoning district subareas, as summarized below.

- **Downtown Core Area (DSP-DC).** This subarea would have multi-story buildings with active first-floor retail, restaurant, and related uses. Upper floors may be commercial and/or residential uses. Buildings would be a maximum of four-stories and/or 50 feet in height. The maximum floor area ratio (FAR) would be 1.0. This is consistent with the Commercial Downtown General Plan designation for the area.



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DOWNTOWN SPECIFIC PLAN – DOWNTOWN CORE (DC) AREA

DOWNTOWN SPECIFIC PLAN – DOWNTOWN SUPPORT (DS) AREA

DOWNTOWN SPECIFIC PLAN – RESIDENTIAL/COMMERCIAL CONVERSION OPPORTUNITY (R/CCO) AREA

AREA RECOMMENDED FOR RESIDENTIAL INFILL

PLAN AREA BOUNDARY

FIGURE III-7

Oakley Downtown Specific Plan EIR

Downtown Specific Plan Subareas and Proposed Zoning

SOURCE: GLOBEXPLORER, MAY 2006; BOTTOMLEY ASSOCIATES, 2009.

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- **Downtown Support Area (DSP-DS).** This subarea would have a mix of commercial, office, and infill residential uses to support the Downtown Core. Maximum building height and FAR would be the same as for the Downtown Core, with certain exceptions, and would be consistent with the General Plan designation of Commercial Downtown for the majority of the subarea.
- **Residential/Commercial Conversion Opportunity Area (DSP-R/CCO).** This subarea would remain primarily residential, with a mix of some office and commercial business in renovated buildings. This area is intended to accommodate small-scale “non-Main Street” office and commercial uses through the conversion of residential building. The existing architectural character of the area would be conserved with emphasis on renovation of existing buildings. The existing zoning for the subarea is primarily Single-Family Residential-High Density (SH), with the southeast portion of the subarea currently zoned Commercial (CO). Existing development regulations, including building heights and setbacks would apply.

2. Building Design Guidelines

The DTSP contains separate guidelines for commercial and residential development. For each development category, guidelines address the design of overall building massing, building façades, roofs and other major components. They also address wall surface materials, windows, porches, and other architectural features. Guidelines also encourage consistent street trees, screening of surface parking areas, and installation of decorative pedestrian-oriented lighting and street furniture.

3. Parking Standards and Guidelines

Shared or “blended” parking standards are recommended to encourage higher density development in the Downtown Core and to decrease area devoted to surface parking lots. Non-residential parking has a minimum requirement of 3 stalls per 1,000 square feet, toward which on-street curbside parking can be counted. Residential units have a minimum requirement of 1 parking stall per unit for one- and two-bedroom units. For multi-family projects, an additional half space for each additional bedroom above two bedrooms would be required and for single-family development projects, an additional space would be required for three or more bedrooms. The Downtown Support Area allows for slightly higher parking ratios. The DTSP requires parking to be located on the side or rear of buildings and for surface lots be planted with shade trees and screened with fencing and/or landscaping.

4. Site Improvements and Landscaping Guidelines

Site improvement and landscaping guidelines are intended to ensure that streets and publicly accessible open spaces are attractive and add value to new development throughout the Downtown area. They address the public streetscape as well as private properties, with specific recommendations for paving materials, walls, fences and piers, fountains, plant materials, and surface grading.

5. Sign Guidelines

The objective of the DTSP’s guidelines for signage is to promote signs that do more than relay information, by functioning as an integral part of the design of buildings and site improvements. Sign guidelines address sign types, proportion, building compatibility, mounting and placement, materials, and maintenance.

E. REQUIRED CITY APPROVALS

Implementation of the DTSP would require discretionary City approvals/actions for the adoption of the DTSP, as well as for adoption of related City Ordinances that would support implementation of the DTSP.

1. City Discretionary Actions

The City of Oakley would take the following discretionary actions in order to implement the DTSP, which require review by the Planning Commission and approval by the City Council:

- Text and Map amendments to the Oakley 2020 General Plan to ensure consistency between the General Plan and DTSP for the land use mix, density, and other Downtown characteristics;
- Zoning Ordinance amendment to create the Downtown Specific Plan (DSP) District;
- Rezoning the DTSP site to the DSP District;
- Zoning Ordinance amendments for the Oakley Redevelopment Area Planned Unit District (RDA PUD) for consistency with the land uses and design guidelines specified by the DTSP;
- Certification of the DTSP EIR; and
- Approval of the DTSP.

In addition, subsequent discretionary actions by the City would be required for the implementation of the capital improvements projects envisioned by the DTSP, including the Main Street Improvements and the Main Street Realignment, as well as for individual development projects proposed under the DTSP.

2. Related City Ordinances and Programs

The City of Oakley is undertaking or has plans to implement several supporting programs and related ordinances that would affect development of projects proposed under the DTSP. The following related City ordinances and programs that are anticipated to be adopted are addressed within the EIR or Initial Study (included as Appendix B) under the appropriate environmental topic:

- Historic Preservation Ordinance;
- Seismic Safety Ordinance;
- Façade Improvement Program;
- In-lieu Parking Fee Program; and
- Updates to the City Fee Schedule.

A. CULTURAL RESOURCES

This section assesses the potential for project impacts to cultural resources and recommends mitigation measures to avoid or reduce the severity of potentially significant impacts. The section is divided into the following components: (1) a description of the methods used to establish the baseline conditions for cultural resources in the DTSP area; (2) a brief overview of Oakley's history, followed by a more detailed project area background; (3) a summary of cultural resources in the DTSP area; (4) an assessment of the DTSP area's archaeological sensitivity; (5) a description of the regulatory context, including the laws, codes, and regulations applicable to cultural resources in Oakley; and (6) an analysis of potential impacts and mitigation measures to reduce the significance of such impacts where possible.

1. Methods

This section describes the methods used to conduct the cultural resources analysis.

a. Background Research. Background research, consisting of a records search, review of City of Oakley documents, and contacts with potentially interested parties, was undertaken for this analysis. The results of each phase of research are described below.

(1) Records Search. Records searches (#06-1104 and #09-0014) for the DTSP area and a 1-mile radius were conducted on January 17, 2007, and July 6, 2009, at the Northwest Information Center (NWIC) of the California Historical Resources Information System, Sonoma State University, Rohnert Park, California. The NWIC is an affiliate of the California Office of Historic Preservation and is the official State repository of cultural resources reports and records for a 16-county area, including Contra Costa County. The purpose of the records search was to identify cultural resource studies that have been prepared for sites in and around the DTSP area, and to identify any cultural resources. Six cultural resources studies have been conducted in, or adjacent to, the DTSP area.[1] Another 13 cultural resources studies have been conducted within a 1-mile radius of the DTSP area.

As part of the records search, LSA reviewed the following State of California inventories for cultural resources in and adjacent to the project area:

[1] Bramlette, Allan G., et al., 1991. *Archaeological Resources Inventory for Los Vaqueros Water Conveyance Alignments, Contra Costa County, California*. Anthropological Studies Center, Sonoma State University, Rohnert Park, California;

Busby, Colin, 1976. *East/Central Contra Costa County Wastewater Management Plan, California, Cultural Resources Survey*. Prepared for Arthur D. Little, Inc., San Francisco, California;

JRP Historical Consulting and Far Western Anthropological Research Group, Inc., 2006. *Cultural Resources Report: Contra Costa Canal Encasement Project*. Davis, California;

Study Report S#-8859 on file at the Northwest Information Center, Sonoma State University, Rohnert Park, California;

Tang, Bai "Tom", 2005. *Historical Resources Compliance Report: Burlington Northern Santa Fe Railway Double Track Project (Segmant 2) Oakley (MP 1146.1) to Port Chicago (MP 1164.4). In and near the Cities of Oakley, Antioch, and Pittsburgh, and the Port Chicago Naval Weapons Station, Contra Costa County, California*. CRM Tech, Riverside, California; and

West, G. James and Patrick Welch, 1996. "Class II Archaeological Survey of the Contra Costa Canal, Contra Costa County, California." Bureau of Reclamation, Sacramento, California.

- *California Inventory of Historic Resources*;[2]
- *Five Views: An Ethnic Historic Site Survey for California*;[3]
- *California Historical Landmarks*;[4]
- *California Points of Historical Interest*;[5] and
- Directory of Properties in the Historic Property Data File (California Office of Historic Preservation, September 18, 2006 and May 27, 2009). The directory includes the listings of the National Register of Historic Places, National Historic Landmarks, the California Register of Historical Resources, California Historical Landmarks, and California Points of Historical Interest.

The following City documents contain information about historical architectural resources in the DTSP area, and were also reviewed as part of the records search:

- *Draft Environmental Impact Report Oakley Old Town Specific Plan and Related Implementation Measures*;[6]
- *Historic Resources Survey & Evaluation, Oakley, California*;[7]

(2) Historic Resources Survey & Evaluation. A survey and evaluation of historical architectural resources within the DTSP area was conducted in 2006 and 2007.[8] This study built upon a previous survey and evaluation conducted by Anne Bloomfield for the 1996 Downtown Specific Plan EIR. Both studies identified a potential Oakley Old Town Historic District consisting of 16 contributing elements that comprise a "mixed group of early 20th century buildings [that] identifies Oakley as a historic town." One of the district contributors, the Oakley Hotel at 3563-87 Main Street, also appears individually eligible for the National Register of Historic Places (National Register). Three other historical architectural resources, bungalows at 2920, 2974, and 3385 Main Street, appear eligible for the California Register of Historical Resources (California Register). The study identified 21 additional historical architectural resources that are eligible as individual resources for listing or designation at the local level.[9]

(3) Contacts with Potentially Interested Parties. On January 19, 2007, LSA sent a letter with maps depicting the DTSP area to the Native American Heritage Commission (NAHC) requesting a review of their Sacred Land File for any Native American cultural resources that might

[2] California Department of Parks and Recreation, 1976. *California Inventory of Historic Resources.* Sacramento.

[3] California Department of Parks and Recreation, Office of Historic Preservation, 1988. *Five Views: An Ethnic Historic Site Survey for California*. Sacramento.

[4] California Department of Parks and Recreation, Office of Historic Preservation, 1990. *California Historical Landmarks*. Sacramento.

[5] California Department of Parks and Recreation, Office of Historic Preservation, 1992. *California Points of Historical Interest*. Sacramento.

[6] Bloomfield, Anne, 1996. Historic Resources, *Draft Environmental Impact Report Oakley Old Town Specific Plan and Related Implementation Measures.* San Francisco, California.

[7] Carey and Company, Inc., 2007. *Historic Resources Survey & Evaluation, Oakley, California.* San Francisco, California.

[8] Ibid.

[9] Ibid., p. 16.

be affected by implementation of the DTSP. Ms. Debbie Pilas-Treadway, NAHC Environmental Specialist III, responded in a faxed letter dated January 22, 2007, that the sacred land file indicated no known "Native American cultural resources in the immediate project area."

On May 21, 2007, LSA sent a letter and a map depicting the DTSP area to the Contra Costa County Historical Society in Martinez requesting information or concerns regarding historical sites in the project area. To date no response has been received from the Contra Costa County Historical Society.

b. Field Review. A field review of the DTSP area was conducted on January 26, 2007. The field review was conducted to identify and confirm historical architectural themes in the DTSP area; preliminarily assess the archaeological sensitivity of the DTSP area; and identify potential impacts to cultural resources as a result of DTSP implementation. The field review was documented with field notes, maps, and photographs.

2. Cultural Resources Setting

This subsection presents an overview of the DTSP area's cultural resources and regulatory setting, including: (1) a summary of the DTSP area's history, from the early 1800s to the present; (2) a summary of cultural resources in and immediately adjacent to the DTSP area; (3) an assessment of the DTSP area's archaeological sensitivity; and (4) a description of the DTSP area's regulatory context, including the laws, codes, and regulations applicable to cultural resources in Oakley. With the exception of individual citations, the information below is contained in the *Historic Resources Survey & Evaluation* prepared for the City of Oakley.[10]

a. Downtown Specific Plan Area History. This section provides an overview of the DTSP area's history, from the early historic period through the present.[11]

(1) Early Historic Period. European entry to California began with the visit of Spanish explorer Juan Cabrillo to San Diego in 1542. Over the next 300 years, European and subsequent American activity in California gradually increased until 1850, when California was admitted to the Union. Claimed initially by Spain, the premier political and military power in Europe in the 1500s, California settlement consisted of a three part strategy: missions to Christianize the Indians, military presidios for defense, and civic pueblos to introduce mercantile interests and initiate trade between the ranchos and importers. California at that time was an outpost of the Spanish colonial frontier of New Spain. The issuance of large land grants to ex-soldiers encouraged settlement of the hinterland by people loyal to Spain. Spanish control, however, waned and eventually collapsed due to vast internal political corruption and social decay in the Spanish imperial structure. Mexico rebelled against a program of imperial reforms and won its independence in 1822; Alta California then became part of the Republic of Mexico.

Due to geographic isolation, California was generally treated as an afterthought by Mexico City over the next 26 years. Mexican governors ensconced in Monterey began liberally issuing large land grants to political supporters. Measured in square leagues (a square league consisted of 4,439 acres) these

[10] Ibid.

[11] This summary addresses only Oakley's history from the historic period to the present because of the focus of the EIR on the historical built environment. It is adapted from *Draft Environmental Impact Report for the Oakley Old Town Specific Plan and Related Implementation Measures* (Mills Associates 1996).

land grants strongly influenced the legacy of land use in the State.[12] The land grant system, via stipulations in the Treaty of Guadalupe Hidalgo, set in place a preexisting legal structure with which later settlers, farmers, and urban residents have had to contend. [13]

The empty, flat sandy area that would later become Oakley was not settled until 1834 when it became part of the Los Meganos land grant, issued by the Mexican governor Jose Noriega to Dr. John Marsh, an immigrant from Massachusetts. Marsh studied medicine at Harvard and after graduating, began a practice under the supervision of a doctor in Minnesota. The doctor died before issuing Marsh a certificate. Despite the lack of recognized credentials, Marsh came west and presented himself to immigration and naturalization as a bona-fide doctor. The Mexican authorities overlooked Marsh's lack of a medical license and became the first physician in California. In 1837, Marsh settled into a four room adobe home on his rancho. Named for the sandy ground and dunes facing the San Joaquin River, Los Meganos was a 13,000-acre cattle ranch. Marsh was murdered in 1856, 2 miles north of Pacheco, between Martinez and his rancho.

Lying in part on the banks of the San Joaquin River at the southern edge of the Delta, Marsh's land became important to the transportation and economic development of the region. The Gold Rush of 1848 soon brought crowds of Mother Lode-bound miners to the area seeking easy wealth in Sierran streambeds and transportation traffic exploded with riverboats traveling from San Francisco piers to landings in Sacramento and Stockton. In the calmer years following the Gold Rush, the Oakley area experienced mild but steady growth. The Iron House schoolhouse was erected in 1862, by the first Oakley area residents, Samuel E. Sellers and his wife Sarah. The name Oakley comes from the town's first postmaster, R.C. Marsh, who named the town in 1898 after the many oak trees. The "-ley" in Oakley means "meadow," and is a suffix found in Old English nomenclature.[14] The coming of the Southern Pacific in the late 1890s brought about a more urban development, and also fostered the linkage between Oakley and wider markets for the town's agricultural products such as almonds, asparagus, apricots, celery, loganberries, tomatoes, wheat, barley, and wine grapes.

(2) 20th Century to the Present. By 1908, the town of Oakley had a population of 300, and the majority of the people depended on farming and the railroad for a livelihood. During busy harvests, a train with as many as 49 refrigerated cars would pull out of the Oakley siding every 48 hours.

Commercial growth continued through the early 20th century. Prior to 1908, telephone service reached Oakley and was located in the post office. A hotel opened in 1909, followed 11 years later by a bank. Telephone directories in the 1920s list various businesses, including an auto garage, a pharmacy, several markets, and an electric shop. A decade later, such services as an auto court, a hotel bar, and "Otto's Big Break fish resort" came into being to accommodate recreational visitors.

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[12] Hoover, Mildred Brooke, Hero Eugene Rensch, Ethel Rensch, and William N. Abeloe, 1990: Introduction, xiii. *Historic Spots in California*. Fourth edition, revised by Douglas E. Kyle. Stanford University Press. Stanford, California.

[13] Pincetl, Stephanie S., 1999. *Transforming California: A Political History of Land Use and Development.* Johns Hopkins University Press. Baltimore, Maryland.

[14] Gudde, Erwin G., 1998. *California Place Names, Fourth Edition*, ed. William Bright. University of California Press. Berkeley, California.

In 1925, a devastating fire razed much of downtown Oakley. Both sides of Main Street (now Highway 4) from O'Hara Avenue to Second Street, with the exception of a church at the corner of O'Hara Avenue and Acme Street and a brick garage across Second Street, were completely destroyed. Reconstruction began immediately and most of the businesses were soon reopened. Rapid reconstruction of the core business district indicated the vigor of the residents and business interests. By the 1940s, Oakley grew from an agricultural and shipping point to a small town. The town had a bungalow-filled residential area and a two-to-three-block-long commercial district along what was originally a county road (now Highway 4) lying on the section line paralleling the railroad. The beginning of WWII in 1941 initiated a period of rapid transformation in the Bay Area as a whole, and Oakley in particular. Feeling pressures to house, feed, and facilitate the masses coming to work in war-related industries, residents wanted to improve Oakley. In 1943, a committee of Oakley citizens formed to advocate for better roads, natural gas service, dial telephones, and formation of a sewer district. Results were quickly realized: by 1945, streets in Oakley had curbs and gutters, and residents had natural gas service and a sewer district.

Following WWII, Oakley's reliance on the railroad for vital commercial links to far-off markets diminished with the increasing use of long distance trucking for transportation needs. A truck could go directly from the fields to a port, a central regional warehouse, or individual stores. As farmers relied less on railroad facilities such as packing sheds, the nature of how downtown Oakley related to the surrounding countryside changed. Fundamentally, the town operated more and more outside the vagaries of railroad schedules. The presence of a State highway alignment through the center of town kept the central business district viable as key economic and demographic changes occurred in the post-war era. During the late 1940s and early 1950s, Oakley's community gradually shifted from agriculture to suburban residential, a pattern that repeated itself throughout the Bay Area and continues to this day.

The near doubling of the Bay Area's population after WWII pushed urban and suburban growth out from the central urban areas to rural areas like Oakley. An increased population drastically altered the relationship between the emerging modern town of Oakley and the older, more rural town with its roots in farming. With Oakley's economic base increasingly devoted to serving the new suburban population increase, agricultural land began to give way to suburban tract development and shopping centers.

Over the years, the Oakley community has seen the development of various commercial structures concentrated near railroad facilities and along the modern highway route alignment. These structures are examples of typical early 20th Century commercial vernacular one- and two-story architecture. Characteristics of this common commercial vernacular are large display windows flanked by piers and parapets of typically unreinforced masonry or wood. Variations on the common California bungalow theme are found in City's auto court cottages and residential dwellings. The Oakley area witnessed many transformations: from an area used by Native Americans for fishing, hunting, and foraging, to a transportation network for explorers and settlers, to a major agrarian resource, and, finally, to the current use as a bedroom community and part of the hub of a water redistribution network for the San Joaquin Valley and Southern California cities. The post-1925 commercial center and earlier pre-war residential areas located in the old downtown area serves as a reminder of Oakley's historic era.

b. Cultural Resources Summary. The records search at the NWIC did not identify any recorded cultural resources in the DTSP area. One cultural resource, P-07-2695, the Contra Costa Canal, is adjacent to the DTSP area. Two cultural resources are recorded within the 1-mile radius: P-07-776/CA-CC0-718H, a segment of the Atchison, Topeka, and Santa Fe railroad; and P-07-2648, a bridge spanning the Contra Costa Canal.

The *Historic Resources Survey & Evaluation* prepared for the City of Oakley, built upon a previous survey by Anne Bloomfield, identified a potential Oakley Old Town Historic District consisting of 16 contributing early 20th century buildings. One of the district contributors, the Oakley Hotel at 3563-87 Main Street, also appears individually eligible for the National Register. Three other historical architectural resources, bungalows at 2920, 2974, and 3385 Main Street, appear eligible for the California Register. The *Historic Resources Survey & Evaluation* identified 21 additional historical architectural resources that are eligible as individual resources for listing or designation at the local level.

The proposed Oakley Old Town Historic District appears eligible for the California Register under Criterion A for its association with the development of Oakley as a commercial center and agricultural shipping depot from 1900-1955. The areas of significance are commerce (for the hotel, garage, and auto court) and community development (for the creation of a well-rounded community with appropriate institutions and dwellings). Within this context, the period of significance is from approximately 1905 to about 1940, years that bracket the construction of the earliest and latest district contributors. More than two-thirds of the district's contributors possess integrity, and the noncontributors do not diminish the district's integrity of feeling.[15]

c. Archaeological Sensitivity. The DTSP area has a low sensitivity for prehistoric archaeology. No recorded archaeological deposits are located in the DTSP area, and there are no recorded prehistoric archaeological deposits within a 1-mile radius. However, the DTSP area takes in a large portion of the historical downtown, and therefore has moderate-to-high sensitivity for historical archaeological deposits associated with early 20th Century Oakley. These deposits, if intact, may contain information important to understanding Oakley's historical development, especially economic recovery and reconstruction following a devastating fire in 1925 that destroyed many of the town's buildings. This information potential may render such deposits eligible for listing in the California Register under Criterion 4, in which case they would be considered historical resources under CEQA.

d. Regulatory Context. This section summarizes the regulatory context for cultural resources in Oakley.

(1) California Environmental Quality Act. CEQA defines a "historical resource" as a resource which is listed in or determined eligible for listing on the California Register (California Register), listed in a local register of historical resources (as defined at PRC 5020.1(k)), identified as significant in a historical resource survey meeting the requirements of section 5024.1(g) of the Public Resources Code, or determined to be a historical resource by a project's lead agency (§15064.5(a)). A historical resource consists of "Any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of

[15] Bloomfield, op. cit., p. 3.

California…. 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" (§15064.5(a)(3)). The California Environmental Quality Act (CEQA) states that a substantial adverse change in the significance of a historical resource is a significant effect on the environment (§15064.5(b)).

CEQA applies to effects on archaeological sites (§15064.5(c)). A Lead Agency applies a two-step screening process to determine if an archaeological site meets the definition of a historical resource, a unique archaeological resource, or neither. Prior to considering potential impacts, the Lead Agency must determine whether a cultural resource meets the definition of a historical resource in §15064.5(a). If the cultural resource meets the definition of a historical resource, then it is treated like any other type of historical resource in accordance with §15126.4. If the cultural resource does not meet the definition of a historical resource, then the Lead Agency applies the second screen to determine if the resource meets the definition of a unique archaeological resource as defined in §21083.2(g). Should the archaeological site meet the definition of a unique archaeological resource, then it must be treated in accordance with §21083.2. If the archaeological site does not meet the definition of a historical resource or a unique archaeological resource, then effects to the site are not considered significant effects on the environment (§15064.5(c)(4)).

(2) Public Resources Code §5097.5. California Public Resources Code §5097.5 prohibits excavation or removal of any "vertebrate paleontological site…or any other archaeological, paleontological or historical feature, situated on public lands, except with express permission of the public agency having jurisdiction over such lands." Public lands are defined to include lands owned by or under the jurisdiction of the state or any city, county, district, authority or public corporation, or any agency thereof. Section 5097.5 states that any unauthorized disturbance or removal of archaeological, historical, or paleontological materials or sites located on public lands is a misdemeanor.

(3) City of Oakley Heritage Tree Ordinance. Section 9.1.1112 of the City of Oakley Municipal Code contains provisions for the protection and preservation of heritage trees. It also includes procedures for the permitted removal of heritage trees under certain circumstances. As defined in the municipal code, a heritage tree is any tree that measures 50 inches or more in circumference at a point four and one-half feet above the natural grade; or any tree or a group of trees worthy of protection and designated as such because of historical or ecological significance, being dependent upon each other for health or survival, or being an outstanding specimen of its species due to such factors as location, size, age, rarity, shape, or health.

Section 9.1.1112 allows for tree removal provided that the Community Development Director reviews the reasons for the removal with respect to economic, scientific, community, and public nuisance considerations. Based on these considerations, the Community Development Director may grant, modify, condition, or deny the removal permit application, after which the decision may be appealed to the Planning Commission. This administrative process provides a means to weigh a removal's impacts with its potential benefits.

(4) City of Oakley General Plan. The Land Use Element and Open Space and Conservation Element of the City of Oakley General Plan contain goals, policies, and implementation programs for the management of cultural resources. These goals, policies, and programs are listed below.

Land Use Element

- Goal 2.5: Encourage the protection of historic, landmark or other structures significant to the Community or to individual neighborhoods.
  - Policy 2.5.1: Review all development proposals involving historic buildings to ensure that modifications are consistent with the overall historic architecture and authenticity of the building.
  - Policy 2.5.2: Continue to support redevelopment and rehabilitation efforts for significant structures in the community.
  - Policy 2.5.3: Review infill development for consistency with architectural character in the surrounding neighborhood.
  - Policy 2.5.4: Consider reducing or waiving some development requirements to encourage the reuse of existing older structures.
  - Policy 2.5.5: In historic areas, promote land uses that are consistent with the historic nature of the area.
    - Implementation Program 2.5.A: Develop a process of review for all development applications involving the modification of historically significant structures.
    - Implementation Program 2.5.B: Support and facilitate grant applications for inventorying, renovating, and restoring significant commercial and residential structures throughout the City.
    - Implementation Program 2.5.C: Periodically update the City's inventory of historic resources. Utilize and update the inventory and analysis of historic resources, that was completed in conjunction with this General Plan.

Open Space and Conservation Element

- Goal 6.4: Encourage preservation of cultural resources within the Plan area.
  - Program 6.4.A: Assess development proposals for potential impacts to significant archaeological resources pursuant to Section 15064.5 of the CEQA Guidelines. Require a study conducted by a professional archaeologist for projects located near creeks or identified archaeological sites to determine if significant archaeological resources are potentially present and if the project will significantly impact the resources. If significant impacts are identified, either require the project to be modified to avoid the impacts, or require measures *Oakley 2020*.
- Goal 6.5: Encourage preservation and enhancement of selected historic structures and features within the community.
  - Policy 6.5.1: Promote the compatibility of new development located adjacent to existing structures of historic significance with the architecture and site development of the historic structure.
  - Policy 6.5.2: Respect the character of the building and its setting during the remodeling and renovation of facades of historic buildings.
  - Policy 6.5.3: Encourage the use of the State Historic Building Code for historic buildings and other structures that contribute to the City's historic character. Use flexibility when applying zoning regulations to historic sites and buildings.
  - Policy 6.5.4: Recognize the value of Oakley's historic resources as an economic development tool.
  - Policy 6.5.5: Ensure that the integrity of historic structures and the parcels on which they are located are preserved through the implementation of applicable design, building, and fire codes.
  - Policy 6.5.6: Work with property owners to preserve historic features within the community.
    - Program 6.5.A: Encourage owners of eligible historic properties to apply for State and Federal registration of these sites and to participate in tax incentive programs for historic restoration.
    - Program 6.5.B: Identify funding mechanisms, including funding from the City to the extent possible, to support programs to preserve, restore, and enhance unique historic sites.
    - Program 6.5.C: Assess development proposals for potential impacts to significant historic resources pursuant to Section 15064.5 of the CEQA Guidelines. For structures that potentially have historic significance, require a study conducted by a professional archaeologist or historian to determine the actual significance of the

structure and potential impacts of the proposed development. Require modification of projects to avoid significant impacts, or require mitigation measures. Protect historical buildings and sites to the extent possible, including modifications to Uniform Code requirements for historic structures.

3. Impacts and Mitigation Measures

Three of the DTSP's proposed elements have the potential to result in impacts to cultural resources. These elements are (1) the Main Street Realignment; (2) the Facade Improvement Program; and (3) the development of Opportunity Sites. Significance criteria, the potential impacts of these three project components, and recommended mitigation measures are described below. Less than significant impacts are discussed first, followed by significant impacts.

a. Criteria of Significance. Significance thresholds based on the CEQA Guidelines are presented below for cultural resources, followed by a description of the significance criteria used to identify a resource's eligibility for listing in the California Register of Historical Resources (California Register).

(1) Cultural Resources Significance Thresholds. The proposed project would have a significant effect on cultural resources if it would:

- Cause a substantial adverse change in the significance of a historical resource as defined in *CEQA Guidelines* Section 15064.5. Specifically, substantial adverse changes include physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of the historical resource would be materially impaired;
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to *CEQA Guidelines* Section 15064.5;
- Disturb any human remains, including those interred outside of formal cemeteries; or
- Remove a heritage tree as defined in Section 9.1.1112 of the City of Oakley Municipal Code.

(2) California Register of Historical Resources Significance Criteria. The California Register is a guide to cultural resources that must be considered when a government agency undertakes a discretionary action subject to CEQA. The California Register helps government agencies identify, evaluate, and protect California's historical resources,[16] and indicates which properties are to be protected from substantial adverse change (PRC §5024.1(a)). Any resource listed in, or eligible for listing in, the California Register is to be considered during the CEQA process.[17]

A cultural resource is evaluated under four California Register criteria to determine its historical significance. A resource must be significant at the local, State, or national level in accordance with one or more of the following criteria:

- Is associated with events that have made a significant contribution to the broad pattern of California's history and cultural heritage; or
- Is associated with the lives of persons important in our past; or

[16] California Office of Historic Preservation, 2001b. *California Register of Historical Resources: Q & A for Local Governments*. Technical Assistance Series No. 4. California Department of Parks and Recreation, Sacramento.

[17] California Office of Historic Preservation, 2001a, op. cit., p. 4.

- 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
- Has yielded, or may be likely to yield, information important in prehistory or history.

In addition to meeting one or more of the above criteria, the California Register requires that sufficient time must have passed to allow a "scholarly perspective on the events or individuals associated with the resource." Fifty years is used as a general estimate of the time needed to understand the historical importance of a resource (CCR Title 14(11.5) §4852 (d)(2)).[18] The State of California Office of Historic Preservation recommends documenting, and taking into consideration in the planning process, any cultural resource that is 45 years or older.[19]

The California Register also requires a resource to possess integrity, which is defined as "the authenticity of a historical resource's physical identity evidenced by the survival of characteristics that existed during the resource's period of significance. Integrity is evaluated with regard to the retention of location, design, setting, materials, workmanship, feeling, and association."[20] Resources that are significant, meet the age guidelines, and possess integrity will generally be considered eligible for listing in the California Register.

b. Less-Than-Significant Cultural Resources Impacts. Although unlikely, the project's Main Street frontage and streetscape improvements could result in the removal of trees meeting the definition of heritage trees under Section 9.1.1112 of the City of Oakley Municipal Code. The municipal code provides procedures for the permitted removal of heritage trees. The procedures allow for tree removal provided that the Community Development Director reviews the reasons for the removal with respect to economic, scientific, community, and public nuisance considerations. Based on these considerations, the Community Development Director may grant, modify, condition, or deny the removal permit application, after which the decision may be appealed to the Planning Commission. Therefore, there is an administrative process in place to balance the removal's impacts (including effects to the city's historical character) with its potential benefits. Should the project require the removal of designated heritage trees, the Municipal Code requires that removal permits be obtained, which provides for the protection and preservation of the subject trees as an option. As described in the Initial Study (Section IV, Biological Resources) included in Appendix B of this EIR, projects developed under the DTSP would comply with the City's Heritage Tree Preservation Ordinance and would be required to obtain a tree removal permit. Following the permit process would ensure that potential impacts to the cultural significance of heritage trees would be less than significant.

c. Significant Cultural Resources Impacts. This section analyzes potentially significant impacts that could occur as a result of policy-level actions implemented as part of the DTSP. Accordingly, further project-specific environmental review may be necessary for specific development activities. The impact discussion that follows is organized by the three project components which could affect cultural resources.

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[18] California Office of Historic Preservation, 1999. *California Register and National Register: A Comparison*. Technical Assistance Series No. 6. California Department of Parks and Recreation, Sacramento.

[19] California Office of Historic Preservation, 1995. "Instructions for Recording Historical Resources." California Department of Parks and Recreation, Sacramento.

[20] California Office of Historic Preservation, 1999. op. cit.

(1) Main Street Realignment. The Main Street Realignment would relocate SR-4 north of its present location, beginning at a point five parcels west of Vintage Parkway, and includes three alternatives for the configuration of the intersection of New Main Street, Old Main Street, and O'Hara Avenue. The new right-of-way would require site clearance of various parcels to accommodate new construction and related facilities. The parcel clearance would require demolition of the existing built environment on each parcel. The *Historical Resources Survey and Evaluation* prepared for the City of Oakley found that the following historical architectural resources slated for removal appear eligible for the California Register either individually or as contributors to the proposed Oakley Old Town Historic District:

- Auto court at 3486 Main Street (district contributor);
- Commercial building at 3510 Main Street (district contributor);
- Commercial building at 3530 Main Street (district contributor);
- Commercial building at 3540 Main Street (district contributor);
- Residential building at 2920 Main Street (individually eligible); and
- Residential building at 2974 Main Street (individually eligible).

Impact CULT-1: The Main Street Realignment component of the DTSP would result in the demolition of six existing historical architectural resources, resulting in a substantial adverse change to the historical significance of select structures themselves, as well as to the Oakley Old Town Historic District as a whole. (S)

The demolition of the six architectural resources listed above would result in a substantial adverse change in their historical significance. The impact would occur to both the Oakley Old Town Historic District, because of its loss of contributors, and to select structures themselves. The substantial adverse change would result from the physical destruction of structural elements that justify and convey the significance of these resources' eligibility for the California Register.

The mitigation measure presented below is designed to reduce the level of significance of the potential impact to the six historic architectural resources, to the extent feasible. The City has determined that relocation or preservation of these historic structures is not feasible and that they will be demolished; therefore, the impact would be significant and unavoidable even with implementation of the following mitigation measure.

Mitigation Measure CULT-1: Prior to their demolition or relocation, historical structures that would be affected by the Main Street Realignment shall be properly documented. The documentation shall, at a minimum, consist of a report documenting the historical context with descriptive narrative of the resource, and an update of the resource's Department of Parks and Recreation form 523 record. The photo-documentation shall capture the form, materials, design, and setting of the buildings to preserve those characteristics that justify their California Register eligibility both individually and as part of the Oakley Old Town Historic District. If building relocation is pursued, the photo-documentation shall include views of the resources in their new locations, with an emphasis on the context and architectural setting of their new surroundings. The photo-documentation shall be prepared in concert with a historical context statement and narrative description of each building to place each property in its architectural and historical context. The documentation package shall be distributed to the NWIC, the Contra Costa County Historical Society, the City of Oakley, the Oakley Chamber of Commerce, and, for the purposes of public outreach, the Oakley Public Library. (SU)

<u>Impact CULT-2</u>: Ground disturbance in the form of site preparation, building demolition, construction, and subsurface utility construction or other ground disturbance may result in a significant impact to unrecorded historical or archaeological resources,[21] including human remains. (S)

The DTSP area has a low sensitivity for prehistoric archaeology, but a moderate-to-high sensitivity for historical archaeological deposits associated with early 20th Century Oakley. These deposits, if intact, may contain information important to understanding Oakley's historical development, and may render such deposits eligible for listing in the California Register under Criterion 4. If the resources were found to be eligible for the California Register, then they would be considered historical resources under CEQA.

The Main Street Realignment and Redevelopment of Opportunity Sites components of the DTSP would require ground disturbing construction for site preparation, building demolition, construction, and subsurface utilities installation, which may result in impacts to archaeological deposits. Impacts to archaeological deposits in the DTSP area that qualify as historical or archaeological resources under CEQA may result in substantial adverse impacts to the resources' significance. In addition, while no human remains have been identified in the project area, the presence of human remains cannot be discounted. Ground-disturbing construction may result in the disturbance of such remains. Implementation of the following two-part mitigation measure would reduce potential impacts to unrecorded historic or archeological resources and previously undiscovered human remains to a less-than-significant level.

<u>Mitigation Measure CULT-2a</u>: If recorded archaeological deposits are discovered during project activities, all work within 25 feet of the discovery shall be redirected. At that time, a qualified archaeologist[22] shall: (1) evaluate the discovery to determine if it meets the definition of a historical or archaeological resource;[23] and (2) make recommendations regarding the disposition of the discovery. If the discovery does not meet the definition of a historical or archaeological resource, then no further study or protection would be necessary prior to project reinitiation. If the discovery does meet the definition of a historical or archaeological resource, it shall be avoided by project activities. If avoidance is not feasible, adverse effects to such resources shall be mitigated in accordance with the recommendations of the evaluating archaeologist. These recommendations may include but are not limited to: excavation and data recovery, site recordation, and appropriate curation of the recovered materials using accepted methods and

[21] Prehistoric archaeological materials can include flaked-stone tools (e.g. projectile points, knives, choppers) or obsidian, chert, or quartzite toolmaking debris; culturally darkened soil (i.e., midden soil often containing heat affected rock, ash and charcoal, shellfish remains, and cultural materials); and stone milling equipment (e.g., mortars, pestles, handstones). Historical materials can include wood, stone, concrete, or adobe footings, walls and other structural remains; debris-filled wells or privies; and deposits of wood, glass, ceramics, and other refuse.

[22] The archaeologist shall meet the Secretary of the Interior's Professional Qualifications for Archeology (36 CFR Part 61).

[23] As defined in CEQA Guidelines §15064.5(a) and §21083.2(g).

techniques. Project personnel shall not collect or move any archaeological material. Fill soils that may be used for construction purposes should not contain archaeological materials. Upon completion of the archaeological evaluation, a report documenting the methods, results, and recommendations of the archaeologist should be prepared and submitted to the City of Oakley and the NWIC.

Mitigation Measure CULT-2b: If human remains are encountered, work within 25 feet of the discovery shall be redirected and the County Coroner notified immediately. At the same time, an archaeologist should be contacted to assess the situation. Project personnel shall not collect or move any human remains or associated materials. If the human remains are of Native American origin, the Coroner must notify the Native American Heritage Commission within 24 hours of this identification. The Native American Heritage Commission will identify a Native American Most Likely Descendant (MLD) to inspect the site and provide recommendations for the proper treatment of the remains and associated grave goods.

Upon completion of the assessment, the archaeologist shall prepare a report documenting the methods and results, and provide recommendations regarding the treatment of the human remains and any associated cultural materials, as appropriate and in coordination with the recommendations of the MLD. The report shall be submitted to the City of Oakley and the NWIC.

(2) Facade Improvement Program. The Facade Improvement Program would alter the appearance of buildings that qualify as CEQA-defined historical resources in Oakley. These improvements may alter the historical integrity of architectural elements that contribute to a building's California Register eligibility, and therefore may result in a substantial adverse change in the significance of a historical resource. The following buildings that qualify as historical resources are being considered for facade improvements:

- 3547 Main Street (facade improvements);
- 3563-87 Main Street (facade improvements);
- 3641-47 Main Street (facade improvements);
- 3637 Main Street (facade improvements);
- 3659 Main Street (facade improvements);
- 201 4th Street (facade improvements);
- 3385 Main Street (paint and repair).

Impact CULT-3: Facade improvements to buildings that qualify as historical resources may result in a loss of historical significance to those resources. (S)

Facade improvements and/or painting and repair may alter the qualities that justify and convey the significance of the buildings listed above. Such alterations may diminish the integrity of the buildings, which may affect their California Register eligibility. Implementation of the following two-part mitigation measure would ensure that this potential impact is reduced to a less-than-significant level.

Mitigation Measure CULT-3a: The City shall ensure that improvements and/or alterations follow the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings* (Secretary's Standards). Pursuant to CEQA Guidelines §15064.5(b)(3), if the improvements and/or alterations are undertaken in a manner consistent with the Secretary's Standards, then potential impacts to historical resources will generally be considered mitigated to a less-than-significant level. (LTS)

If improvements and/or alterations cannot be undertaken in a manner consistent with the Secretary's Standards, then Mitigation Measure CULT-3b shall be implemented.

Mitigation Measure CULT-3b: Improvements and/or alterations to buildings identified as historical resources shall be developed in consultation with a qualified architectural historian.[24] The purpose of the consultation is to (1) identify character-defining features of the subject buildings that should not be altered by the improvements; and, in the case of conflicts between plan objectives and historical values, (2) recommend approaches to lessen an undesirable loss of historical integrity by using alternative materials and compatible designs. The City shall ensure that the feasible recommendations of the architectural historian are implemented. If the recommendations cannot be feasibly implemented, the building's pre- and post-alteration condition shall be photo-documented, and its Department of Parks and Recreation form 523 record shall be updated to reflect the changes, and be submitted to the NWIC and the City of Oakley. Implementation of this measure will reduce this impact to a less-than-significant level. (LTS)

(3) Development of Opportunity Sites. The proposed plan for development opportunity sites includes a process by which vacant or underutilized parcels will be redeveloped or "upgraded" to accommodate new uses. Depending on the selection of opportunity sites, the nature of the proposed development, and the architectural context of the changes, this redevelopment may result in (1) incompatibility with new construction; (2) the destruction of, or substantial adverse change to, buildings that qualify as historical resources; and (3) the disturbance of archaeological deposits and/or human remains. Implementation of Mitigation Measures CULT-2a and -2b, above, would ensure that potential impacts to unrecorded historic or archeological resources and human remains would be reduced to a less-than-significant level.

Impact CULT-4: Development of DTSP Opportunity Sites may result in the development of new commercial or office uses that may (1) demolish or substantially alter historical resources; and/or (2) introduce new development that adversely alters the setting of historical resources. (S)

The DTSP identifies near- and long-term opportunity sites, as well as in-fill opportunity sites. Depending on the nature of the resources involved, and the character of the new development, impacts may result from the redevelopment of these opportunity sites. The *Historical Resources Survey and Evaluation* provides an excellent baseline for built environment historical resources in the DTSP area, and enables the identification of opportunity sites that have cultural resource issues. Of particular concern are the land uses and the overall setting in the Old Town Oakley Historic District.

[24] The architectural historian shall meet the Secretary of the Interior's Professional Qualifications for Architectural History (36 CFR Part 61)

Implementation of the following two-part mitigation measure would reduce potential impacts to historic resources that may result from redevelopment/development of DTSP opportunity sites, although in some cases, not to a less-than-significant level.

Mitigation Measure CULT-4a: If a development opportunity site contains a historical resource (either individually significant or significant as part of the District) and the resource will be integrated into the redevelopment, then Mitigation Measures CULT-3a and -3b shall be implemented. Implementation of either measure would reduce this impact to a less-than-significant level.

Mitigation Measure CULT-4b: If a development opportunity site is adjacent to a historical resource or within the boundary of the District, then the design for the new construction shall take into account potential adverse impacts to the significance of adjacent resources and their setting. The project applicant for individual projects shall ensure that prospective designs are developed in consultation with a qualified architectural historian. The purpose of the consultation shall be to (1) identify proposed design elements that will result in a significant alteration of the setting of nearby resources; and (2) recommend design changes to lessen the undesirable loss of integrity of setting with respect to exterior treatments, massing, and building setbacks. The City shall ensure that the feasible design recommendations of the architectural historian are implemented in the executed building design. If the recommendations cannot be feasibly implemented, then the City shall require individual project applicants to fund photo-documentation of the pre- and post-construction setting of the opportunity site and to update the Department of Parks and Recreation form 523 records for adjacent resources (or, if applicable, the District) to reflect the changes. (SU)

B. TRANSPORTATION, CIRCULATION AND PARKING

This section describes the existing traffic and circulation system, including pedestrian and transit conditions within the Plan Area and vicinity and provides an analysis of the potential impacts that would occur with implementation of the DTSP. Mitigation measures are recommended, as appropriate. Appendix C contains the Transportation Impact Analysis (TIA)[1] and technical background information used to prepare this section.

1. Setting

The following discussion describes: the scope of the transportation analysis; methodologies employed in the analysis; existing and cumulative volumes without the project; and service levels at study intersections.

a. Scope of Study. Study intersections were selected for analysis based on preliminary trip generation calculations that indicated these intersections would be most affected by implementation of the proposed project. The 12 existing and future study intersections are listed below and shown on Figure IV.B-1. Intersections marked with an * indicate future intersections that would be created by implementation of the DTSP and the associated Main Street Realignment.[2]

1. Oakley Road/Empire Avenue
2. Main Street/Empire Avenue
3. Main Street/Vintage Parkway
4. Main Street/Norcross Lane
5. Main Street/O'Hara Avenue
6. Main Street/Rose Avenue
7. Main Street/West Cypress Road
8. West Cypress Road/O'Hara Avenue
9. Main Street Bypass/Main Street, West*
10. Main Street Bypass/Vintage Parkway*
11. Main Street Bypass/Norcross Lane*
12. Main Street Bypass/O'Hara Avenue*

The study intersections were evaluated for the following scenarios:

- **Existing Conditions.** Existing conditions are based on traffic volumes obtained from traffic counts collected in November 2008 and existing roadway geometries.
- **Cumulative (2030) No Project.** Future (Year 2030) forecast conditions are based on the City of Oakley General Plan buildout and planned roadway improvements. This scenario assumes that the land uses in the study area would remain the same as existing conditions and that the Main Street Realignment would not be constructed.
- **Cumulative (2030) Plus Project.** Future (Year 2030) forecast conditions with buildout of both the General Plan and the DTSP. This scenario assumes that the Main Street Realignment would be constructed as a four-lane arterial.

b. Study Methods. This section describes the methods used to evaluate the traffic conditions for each scenario described above. Descriptions of the data requirements, analysis methodologies, and applicable level of service standards are described below.

[1] Fehr and Peers, 2009. *Final Transportation Impact Analysis Report, City of Oakley Downtown DTSP*. August.

[2] Recent planning and traffic analyses have referred to the realignment of Main Street variously by the terms "Realignment" and "Bypass." Throughout this EIR, the DTSP proposed Main Street Realignment capital improvement project is referred to as such. In this section, where the Main Street Realignment project is referred to by the operational roadway name, the term "Bypass" is retained. The two terms may also be considered interchangeable.

(1) Data Collection. Existing traffic conditions at most of the study intersections were based on morning (7:00 a.m. to 9:00 a.m.) and evening (4:00 p.m. to 6:00 p.m.) peak period intersection turning movement counts conducted in November 2008. The counts were conducted on clear days with area schools in normal session. For each intersection count period, universal peak hour periods of 7:30 a.m. to 8:30 a.m. and 4:45 p.m. to 5:45 p.m. were used.

(2) Intersection Level of Service Methodology. 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 IV.B-1 summarizes the relationship between the v/c ratio, delay, and LOS for signalized intersections.

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 IV.B-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.

c. Existing Transportation Network. The existing transportation network and intersection configurations for the project study area are described below.

(1) Existing Roadway Network. The project location and the surrounding roadway network are illustrated in Figure IV.B-1. The major roadways serving the Plan Area are described below.

- **Main Street (State Route 4).** SR-4 is the major thoroughfare in the study area and is generally an east-west arterial extending from an interchange with SR 160 on the west to the cities of Brentwood and Stockton on the southeast. West of the project area, Main Street typically provides two travel lanes in each direction with a two-way center left-turn lane. Within the Plan Area, Main Street provides one lane in each direction. Main Street has an Average Daily Traffic (ADT) volume of 26,000 vehicles west of O'Hara Avenue.

Table IV.B-1: Signalized Intersection LOS Criteria

	CCTALOS	HCM	
LOS	**Sum of Critical V/C Ratio**	**Average Control Delay per Vehicle (seconds)**	**Description**
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: Contra Costa Transportation Authority, 1997. *Technical Procedures*.

Table IV.B-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: Transportation Research Board, 2000. Highway Capacity Manual.

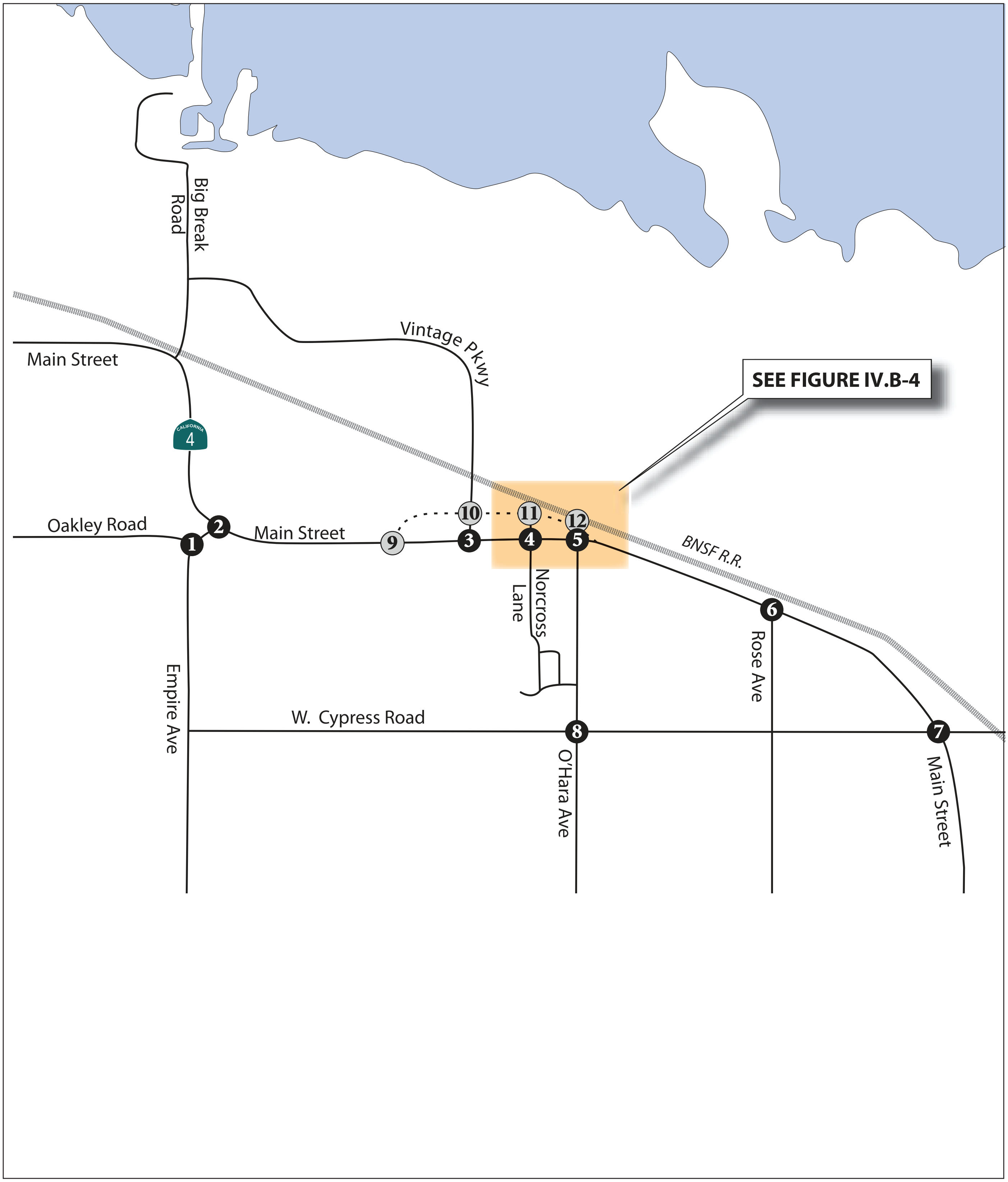

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FIGURE IV.B-1

LEGEND

1 = Existing Study Intersection

9 = Future Study Intersection

= Future Roadway

= Railroad

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Oakley Downtown Specific Plan EIR

Study Intersection Locations

SOURCE: FEHR & PEERS, 2009

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- **O'Hara Avenue.** O'Hara Avenue is a north-south roadway in the study area, providing connections between Main Street in Oakley and Brentwood. O'Hara Avenue is generally residential and provides one travel lane in each direction.
- **Empire Avenue.** Empire Avenue is a major north-south roadway in the study area, providing connections between Main Street in Oakley and Brentwood and Antioch to the south. Empire Avenue typically provides two-travel lanes in each direction.
- **Cypress Road.** Cypress Road is a two- to four-lane east-west arterial that begins at Empire Avenue and continues east of Main Street (SR 4). Cypress Road is generally residential in the study area.
- **Vintage Parkway.** Vintage Parkway is a two-lane north-south residential collector west of Downtown Oakley and north of Main Street.

(2) Bicycle and Pedestrian Facilities. Limited bicycle and pedestrian facilities exist within the Plan Area. The nearest designated bicycle facilities are provided on Vintage Parkway, and portions of Empire Avenue and West Cypress Road. The *City of Oakley General Plan*, *City of Oakley Parks, Recreation and Trails Master Plan*,[3] and *East County Bikeway Plan*[4] propose that several new bicycle facilities be constructed in the future. Within the study area, Class II bicycle lanes are planned for Main Street, O'Hara Avenue, and Rose Avenue. Also, a Class I multi-use trail is planned along the Burlington Northern Santa Fe railroad tracks, which will be a part of the regional trail network to be maintained by the East Bay Regional Park District.

Sidewalks and other pedestrian amenities are provided intermittently throughout the Plan Area. Typically, narrow sidewalks are provided along the south side of Main Street and no sidewalks are provided along the north side. Within the Plan Area, crosswalks on Main Street are provided at Vintage Parkway and O'Hara Avenue. Limited pedestrian facilities and heavy truck traffic along Main Street contribute to the limited pedestrian activity in Downtown Oakley.

(3) Transit Service. Tri-Delta Transit currently operates four local bus routes and two express commuter routes in the project area, as described below.

- **Route 300.** The Pittsburg Bay Area Rapid Transit (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 project area located near the Main Street/Vintage Parkway and Main Street/Norcross Lane intersections. The bus operates from 4:15 a.m. to approximately 10:00 p.m. on 15- to 30-minute headways.
- **Route 383.** The Oakley/Antioch/Freedom High School route connects Oakley and Antioch and provides service to Freedom High School in Oakley. The nearest stop to the Plan Area is at the Main Street/Vintage Parkway intersection. This route is only in service on weekdays and provides both clockwise and counterclockwise routes. The counterclockwise route runs at approximately one-hour headways between 5:30 a.m. and 6:00 p.m. The clockwise route runs twice during the a.m. peak hour period only.

[3] Oakley, City of, 2003. *City of Oakley Parks, Recreation and Trails Master Plan*. March.

[4] Contra Costa, County of, 2001. *East County Bikeway Plan*. November.

- **Route 391.** The BART/Pittsburg/Antioch/Oakley/Brentwood route, provides weekday service to most East County cities. In the project area, stops are provided at the Main Street/O'Hara Avenue intersection. The route operates from 4:00 a.m. to 1:15 a.m. on 30- to 60-minute headways.
- **Route 393.** The Bay Point/BART/Pittsburg/Antioch/Oakley/Brentwood route, provides weekend service and mirrors weekday Route 391, with additional service to Bay Point. The route operates from 5:20 a.m. to 1:30 a.m. on 60-minute headways.
- **Delta Express.** The express commuter bus operated 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 Lucky store (located in the shopping center on the southeast corner of the Empire Avenue/Main Street intersection) at 4:55 a.m. and 5:25 a.m., and can board for return service from the Dublin/Pleasanton BART Station at 4:34 p.m. and 5:49 p.m. Another route, which connects to Lawrence Livermore National Lab (LLNL), departs from the Oakley Lucky store at 5:23 a.m. and 6:18 a.m., with return trips leaving from the LLNL East Gate at 4:14 p.m. and 5:14 p.m.

d. Existing Traffic Conditions. Intersection operations were evaluated for the weekday AM and PM peak hours at the eight existing study intersections. The existing peak period traffic counts are provided in Appendix C. Figure IV.B-2 presents the existing intersection peak hour turning movements, intersection lane configurations and traffic controls. As shown in Table IV.B-3, most study intersections operate at acceptable levels of service based on the CCTALOS and HCM methods as compared to the LOS thresholds presented in Table IV.B-4 during both AM and PM peak hours.

Only the stop-controlled northbound approach of the Main Street/Norcross Lane intersection operates at unacceptable LOS F during both AM and PM peak hours. This is because northbound traffic on Norcross Lane must yield to the heavy eastbound and westbound traffic on Main Street. However, the number of vehicles experiencing LOS F conditions at this intersection is small, as most vehicles exiting the neighborhoods south of Main Street use the signalized Main Street/O'Hara Avenue intersection to turn left into westbound Main Street. While the Main Street/Norcross Lane intersection currently operates at an unacceptable level of service, the intersection does not have traffic volumes that satisfy *Manual on Uniform Traffic Control Devices* (MUTCD) peak hour signal warrants.

e. Cumulative (2030) Traffic Conditions. For this scenario, the operating conditions of the study intersections are based on buildout of the City's General Plan, but without implementation of the DTSP. The roadway network and land uses within the Plan Area are assumed to be the same as Existing conditions for the Cumulative No Project conditions analysis. Cumulative roadway improvements and traffic volume forecasts are discussed below.

(1) Planned 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 the following:

- Widening of Segment 2 of the SR 4 Bypass to a four-lane freeway between Lone Tree Way and Balfour Road with full interchanges at Sand Creek Road and Balfour Road;
- 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;

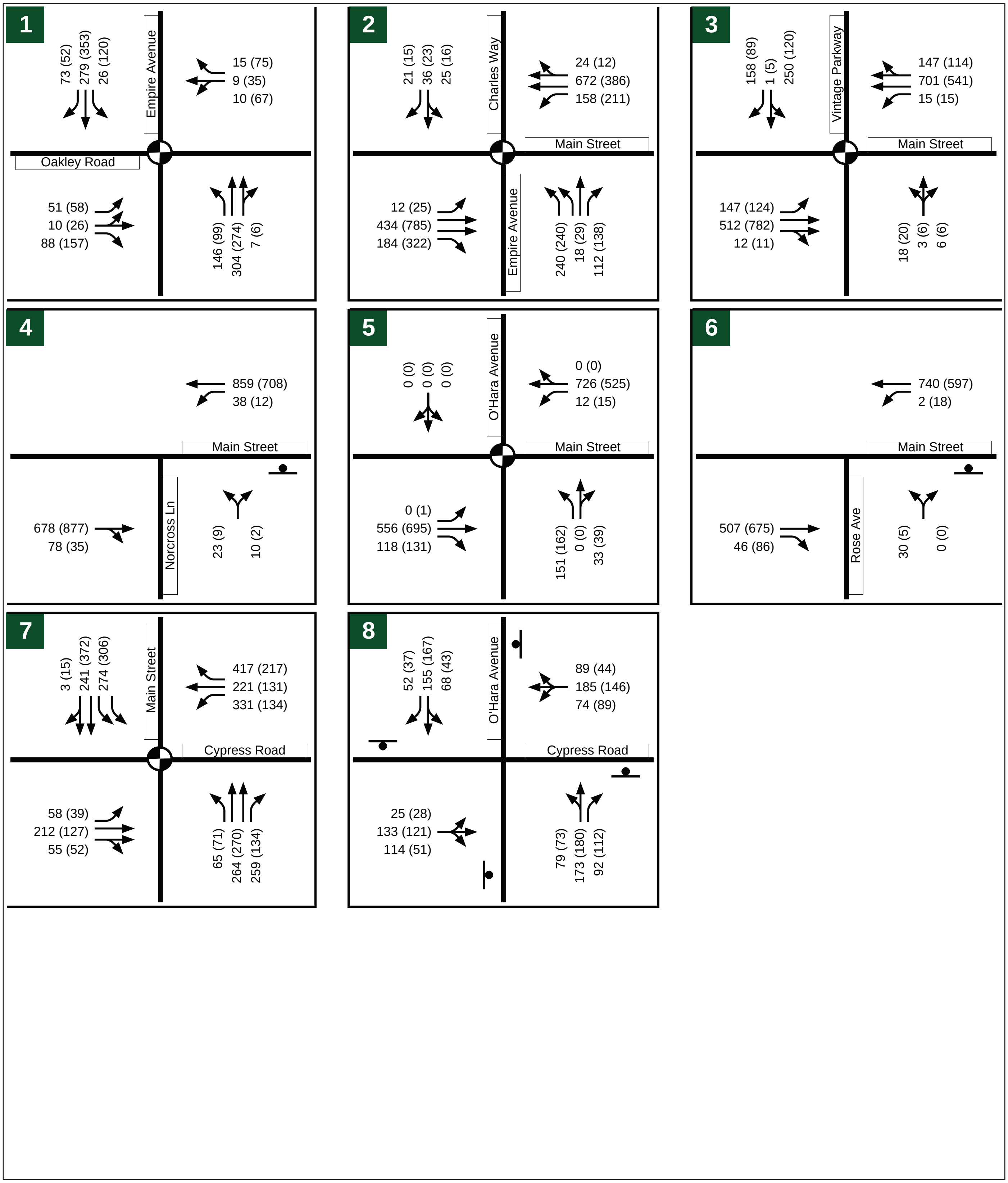

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FIGURE IV.B-2

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LEGEND

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

= Signalized Intersection

= Stop Sign

Oakley Downtown Specific Plan EIR

Existing Peak Hour Intersection Volumes, Lane Configuration, and Traffic Control

SOURCE: FEHR & PEERS, 2009

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Table IV.B-3: Existing Conditions Intersection Peak Hour LOS Summary

Intersection	Control[a]	Peak Hour	CCTALOS		HCM	
			V/C Ratio[b]	LOS	Delay[c]	LOS
1. Oakley Road/Empire Avenue	Signal	AM PM	0.29 0.38	A A	19 23	B C
2. Main Street/Empire Avenue	Signal	AM PM	0.34 0.47	A A	18 21	B C
3. Main Street/Vintage Parkway	Signal	AM PM	0.51 0.37	A A	20 12	B B
4. Main Street/Norcross Lane	SSSC	AM PM	-- --	-- --	**64 (NB)** **>70 (NB)**	**F** **F**
5. Main Street/O'Hara Avenue	Signal	AM PM	0.51 0.51	A A	10 15	B B
6. Main Street/Rose Avenue	SSSC	AM PM	-- --	-- --	33 (NB) 30 (NB)	D D
7. West Cypress Road/Main Street	Signal	AM PM	0.50 0.34	A A	31 24	C C
8. West Cypress Road/O'Hara Avenue	AWSC	AM PM	-- --	-- --	20 16	C C

Bold indicates intersection operating at deficient level of service.

[a] Signal = Signalized intersection
SSSC = Side-street stop-controlled intersection
AWSC = All-way stop-controlled intersection

[b] Volume-to-capacity ratio (V/C) determined for all signalized intersections using the CCTALOS method.

[c] 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, delay for worst approach (in seconds per vehicle) is presented.

Source: Fehr & Peers, 2009.

Table IV.B-4: Intersection LOS Thresholds

Study Location	LOS Threshold	Source
Signalized intersections along Main Street • Main Street/Empire Avenue • Main Street/Vintage Parkway • Main Street/O'Hara Avenue • Main Street/Cypress Road • Main Street Bypass/Vintage Parkway (future) • Main Street Bypass/Norcross Lane (future) • Main Street Bypass/Main Street (future)	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/Norcross Lane • Main Street/Rose Avenue • Main Street Bypass/Main Street/O'Hara Avenue (future – Alternative 2 only)	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	LOS D (Avg. Delay = 55 sec. V/C = 0.90)	City of Oakley General Plan
Unsignalized intersections on Basic Routes in Oakley • West Cypress Road/O'Hara Avenue	LOS D (Delay = 35 sec.)	City of Oakley General Plan

Source: CCTA and City of Oakley, 2007.

- Widening of Main Street to a six lane arterial between Big Break Road and SR 160; and
- Widening of Laurel Road to a four-lane arterial between Empire Avenue and Main Street.

(2) Traffic Volumes and Levels of Service. Traffic volumes for Cumulative conditions include existing traffic counts and traffic from approved and planned developments in the region. These conditions represent the likely traffic levels in the year 2030, when buildout of the proposed DTSP is expected. Considering the major changes in the regional roadway network and the amount of regional growth expected by 2030, the Contra Costa Transportation Authority (CCTA) Decennial Countywide Travel Demand Model was selected as the most appropriate tool to forecast Cumulative No Project AM and PM peak hour intersection volumes.

Due to general growth in the region, forecasts of cumulative traffic volumes in the study area are generally higher than Existing conditions. Since the Main Street Realignment would not be constructed under the Cumulative No Project scenario, and Main Street would continue as a two lane arterial, similar to Existing conditions, a portion of through traffic that could use Main Street would divert to SR 4 Bypass freeway, Laurel Road, West Cypress Road, and other east-west arterials and collectors. Thus, despite the projected growth in the study area, through traffic volumes along Main Street are forecast to increase by only 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. Figure IV.B-3 presents the forecasted Cumulative No Project AM and PM peak hour intersection volumes.

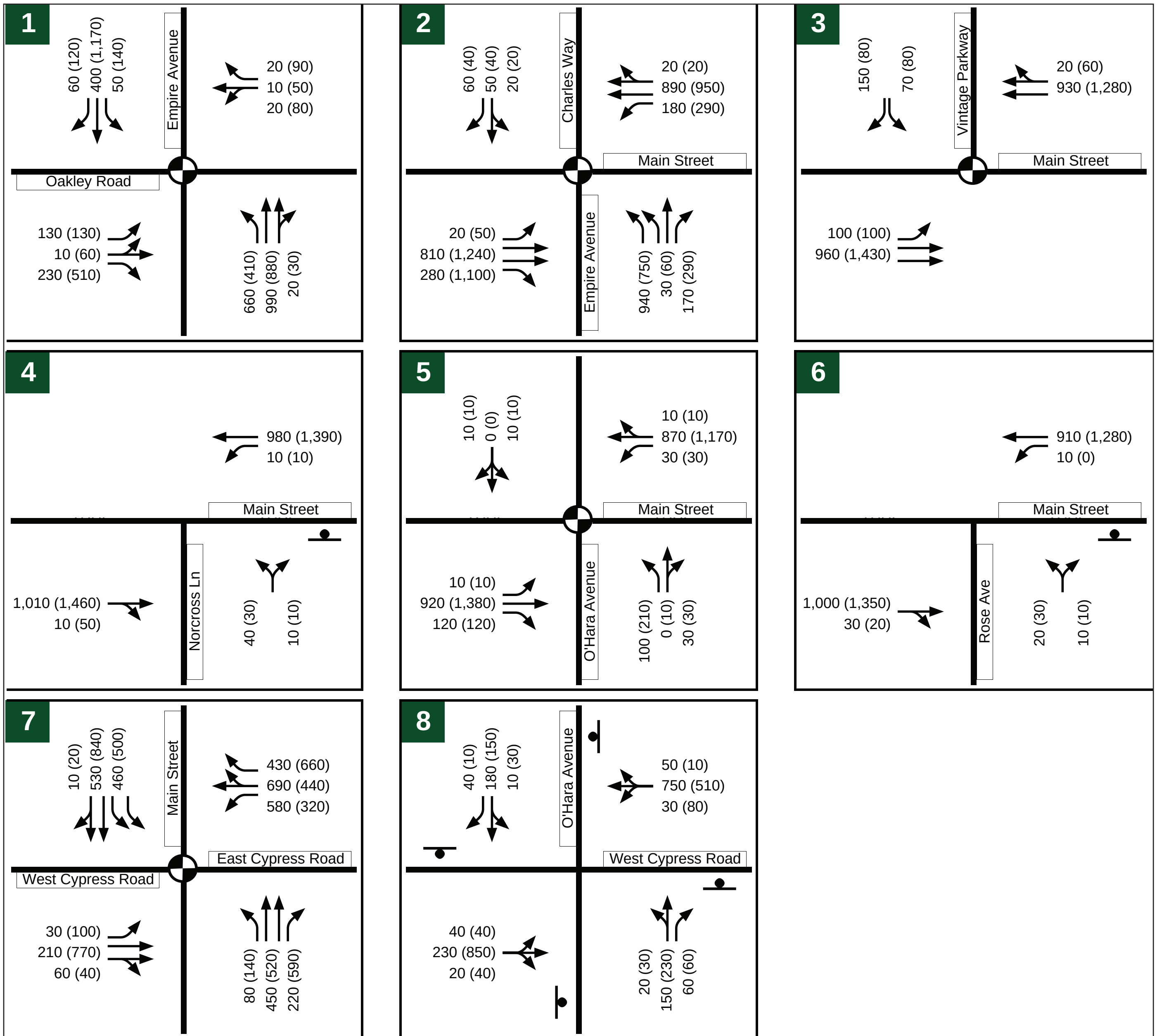
Table IV.B-5 presents the results of the intersection LOS analysis for the Cumulative No Project conditions. Additional detail is provided in Appendix C. In general, most study intersections would operate with worse LOS under the Cumulative conditions than Existing conditions. As depicted in Table IV.B-5 (and shown in boldface type), the following intersections would fail to meet acceptable level of service thresholds in 2030, independent of the proposed project:

- Intersection #1 - Oakley Road/Empire Avenue;
- Intersection #2 - Main Street/Empire;
- Intersection #4 - Main Street/Norcross Lane;
- Intersection #5 - Main Street/O’Hara Avenue;
- Intersection #6 - Main Street/Rose Avenue; and
- Intersection #8 - West Cypress Road/O’Hara Avenue.

2. Impacts and Mitigation Measures

This section identifies impacts of the DTSP and recommends appropriate mitigation measures where feasible. The significance criteria are presented below followed by a discussion of the project’s less-than-significant and significant traffic and circulation impacts.

a. Criteria of Significance. Based on the adopted policies of CCTA and the City of Oakley, a significant traffic impact would occur if the addition of DTSP traffic would cause:



LSA

FIGURE IV.B-3

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LEGEND

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

= Traffic Signal

= Stop Sign

Oakley Downtown Specific Plan EIR

Cumulative (2030) No Project Peak Hour Intersection Volumes, Lane Configuration, and Traffic Control

SOURCE: FEHR & PEERS, 2009

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Table IV.B-5: Cumulative (2030) No Project Conditions Intersection Peak Hour LOS Summary

Intersection	Control[a]	Peak Hour	CCTALOS		HCM	
			V/C Ratio[b]	LOS	Delay[c]	LOS
1. Oakley Road/Empire Avenue	Signal	AM PM	0.67 **1.10**	B **F**	32 **>100**	C **F**
2. Main Street/Empire Avenue	Signal	AM PM	0.71 0.88	C D	34 **61**	C **E**
3. Main Street/Vintage Parkway	Signal	AM PM	0.65 0.49	B A	9 11	A B
4. Main Street/Norcross Lane	SSSC	AM PM	-- --	-- --	**>70 (NB)** **>70 (NB)**	**F** **F**
5. Main Street/O'Hara Avenue	Signal	AM PM	0.61 **0.94**	B **E**	14 **74**	B **E**
6. Main Street/Rose Avenue	SSSC	AM PM	-- --	-- --	**>70 (NB)** **>70 (NB)**	**F** **F**
7. West Cypress Road/Main Street	Signal	AM PM	0.73 0.78	C C	43 48	D D
8. West Cypress Road/O'Hara Avenue	AWSC	AM PM	-- --	-- --	**>70** **>70**	**F** **F**

Bold indicates intersection operating at deficient level of service.
[a] Signal = Signalized intersection
SSSC = Side-street stop-controlled intersection
AWSC = All-way stop-controlled intersection
[b] Volume-to-capacity ratio (V/C) determined for all signalized intersections using the CCTALOS method.
[c] 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, delay for worst approach (in seconds per vehicle) is presented.
Source: Fehr & Peers, 2007.

- Operations of a signalized study intersection to decline from an acceptable level to an unacceptable level (service level thresholds are defined in Table IV.B-4 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 IV.B-4), 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,
- 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.

b. Project Trip Generation. The CCTA Travel Demand Model estimates that the proposed DTSP would generate about 483 net new AM peak hour and 945 net new PM peak hour trips. The model estimated trip generation (which is based on number of jobs for non-residential land uses) was compared to trip generation estimated using the trip generation rates published by Institute of Transportation Engineers (ITE) in *Trip Generation* (which is based on square-feet for non-residential land uses). Table IV.B-6 compares the trip generation for the proposed DTSP using the CCTA model and ITE trip generation rates. The CCTA model only includes primary trips and does not account for pass-by or diverted trips (i.e., trips already on the roadway system that make an interim stop at the

Table IV.B-6: Trip Generation Comparison

Land Use[a]	Size	Trips	
		AM Peak Hour	**PM Peak Hour**
Single-Family Residential[b]	-2 DU	-2	-2
Multi-Family Residential[c]	302 DU	154	187
Retail[d]	360 KSF	371	1,342
Office[e]	-2 KSF	-3	-3
Industrial [f]	-28 KSF	-26	-27
Subtotal		*494*	*1,497*
40% Retail Pass-by[g]		0	-540
Net New Trips, as estimated using ITE rates		*494*	*957*
Total Project Trip Generation, as estimated by model[h]		483	945
Percent Difference		-2%	-2%

Note: DU = Dwelling Unit, KSF = one thousand square feet.

[a] Land uses based on net changes in land use as summarized in Appendix C.

[b] Trip generation determined from average rates for Single-Family Detached Housing (Land Use Code 210) in ITE *Trip Generation* (8th Edition) (AM Peak Hour: 0.75 trips per DU; PM Peak Hour: 1.01 trips per DU)

[c] Trip generation determined from average rates for Apartments (Land Use Code 220) in ITE *Trip Generation* (8th Edition) (AM Peak Hour: 0.51 trips per DU; PM Peak Hour: 0.62 trips per DU)

[d] Trip generation determined from average rates for Shopping Center (Land Use Code 820) in ITE *Trip Generation* (8th Edition) (AM Peak Hour: 1.00 trips per KSF; PM Peak Hour: 3.73 trips per KSF)

[e] Trip generation determined from average rates for Office (Land Use Code 710) in ITE *Trip Generation* (8th Edition) (AM Peak Hour: 1.55 trips per KSF; PM Peak Hour: 1.49 trips per KSF)

[f] Trip generation determined from average rates for General Light Industrial (Land Use Code 110) in ITE *Trip Generation* (8th Edition) (AM Peak Hour: 0.92 trips per KSF; PM Peak Hour: 0.97 trips per KSF)

[g] Pass-by reduction based on average pass-by trip percentage for Shopping Center (ITE Land Use Code 820) in ITE *Trip Generation Handbook (Second Edition).*

[h] Net new trips generated by the proposed project as estimated by the CCTA Travel Demand Model.

Source: Fehr and Peers, 2009

site). Based on data presented in ITE *Trip Generation Handbook*, about 40 percent of trips generated by retail developments of similar size adjacent to roadways with similar volumes as Main Street are either pass-by or diverted trips. Therefore, the trip generation estimated by ITE rates was reduced by 40 percent to provide trip generation comparable to the CCTA model. Based on the ITE *Trip Generation* rates, the proposed project is estimated to generate 494 net new AM peak hour and 957 net new PM peak hour trips.

As shown in Table IV.B-6, the CCTA model generates about 2 percent fewer trips than estimated by ITE *Trip Generation* rates during both AM and PM peak hours. Since both ITE and the CCTA model result in similar trip generation, the trip generation estimated by the CCTA model is considered valid.

c. Plan Area Roadway Network. Based on the proposed DTSP, the following roadway network modifications are assumed as part of the proposed project.

- Construction of the Main Street Realignment as a four-lane arterial north of the existing Main Street between west of Vintage Parkway and O'Hara Avenue. The proposed Main Street Bypass would intersect existing Vintage Parkway. Norcross Lane would be extended north to intersect the new Main Street Bypass (See Figure IV.B-1).
- The following three design options, as shown in Figure IV.B-4, are proposed for the eastern intersection of the Main Street Bypass with Main Street:
  - Option #1 would extend O'Hara Avenue to the Main Street Bypass to create a new signalized intersection. The existing segment of Main Street between O'Hara Avenue and Second Street would also be eliminated.
  - Option #2 would create a four-approach, two-lane roundabout with the Main Street Bypass comprising the northwestern and eastern approaches, Main Street comprising the southwestern approach, and O'Hara Avenue comprising the southern approach.
  - Option #3 would create a four approach, signalized intersection with the Main Street Bypass, Main Street, and O'Hara Avenue.
- The newly created intersections along the Main Street Bypass at Main Street (western end), Vintage Parkway, and Norcross Lane would be signalized.
- The existing Main Street would remain a two-lane arterial and would be modified to be more pedestrian oriented. As a result, the existing Main Street/Vintage Parkway and Main Street/Norcross Lane intersections would be converted to all-way stop-control.[5]

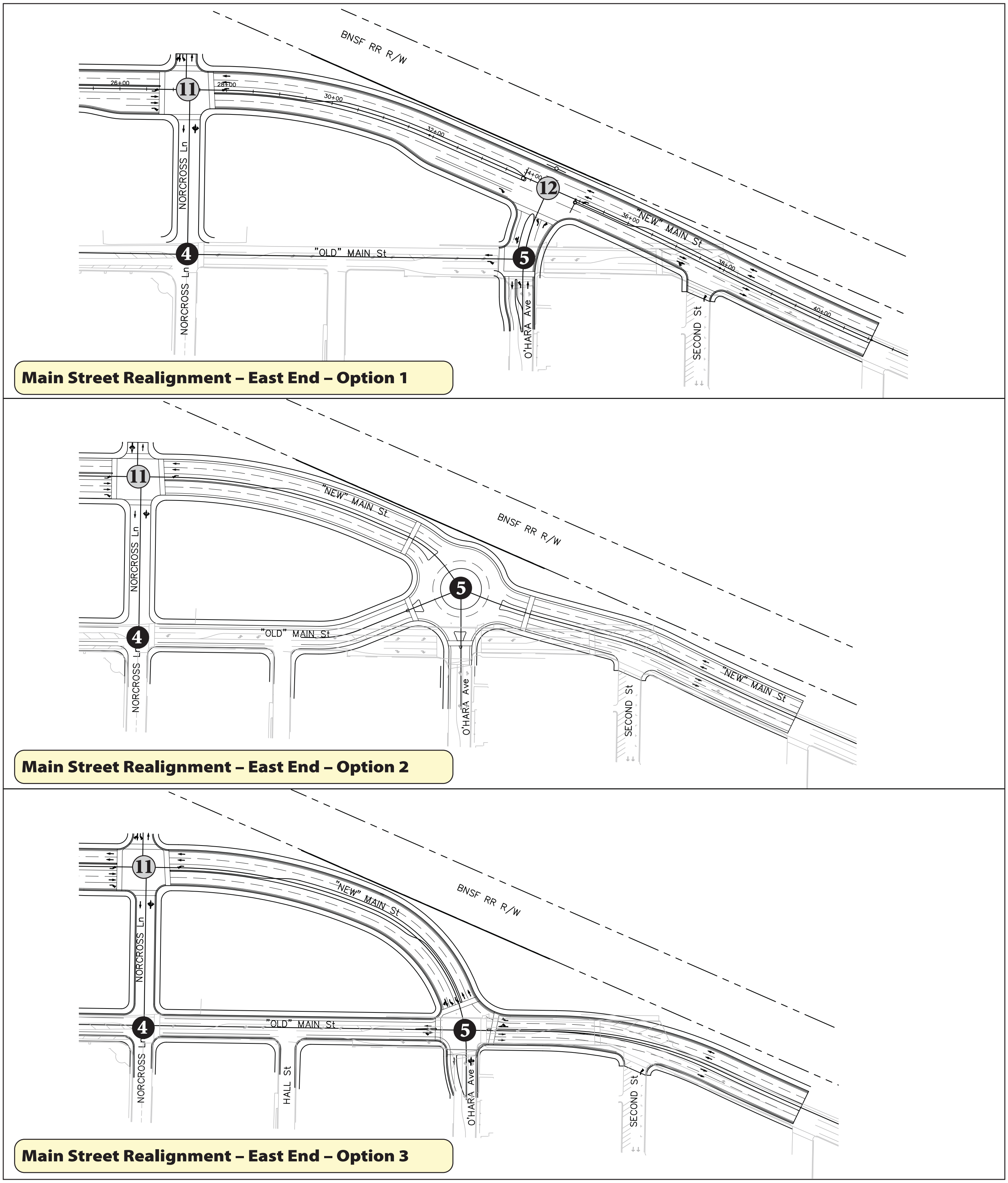
The three Main Street Realignment options are included in the Cumulative Plus Project conditions model runs to determine their effects on areawide traffic patterns.

d. Less-than-Significant Transportation, Circulation and Parking Impacts. The following less-than-significant transportation, circulation, and parking impacts would result from implementation of the DTSP.

(1) Cumulative Intersection Level of Service. Similar to the Cumulative No Project conditions, the CCTA Decennial Countywide Travel Demand Model was used to forecast Cumulative Plus Project AM and PM peak hour intersection volumes. The 2030 land uses were modified to include the project land uses. In addition, the 2030 roadway network was modified to include the planned roadway improvements previously discussed.

The Cumulative Plus Project AM and PM peak hour intersection volumes are presented in Figure IV.B-5. In comparison to the Cumulative No Project conditions volumes, the completion of the Main Street Realignment would result in an increase in through traffic along Main Street, and a decrease in traffic on other parallel roadways such as West Cypress Road and Laurel Road. Additional traffic generated by the proposed DTSP would also contribute to the increase in traffic volumes in the study area. Since the current Main Street would be modified to be more pedestrian friendly, it is expected that it would mostly serve local traffic with minimal through traffic.

[5] The DTSP shows the Main Street/Vintage Parkway and Main Street/O'Hara Avenue intersections as remaining signalized. However, it is recommended that these intersections be converted to all-way stop-controlled to maintain the proposed pedestrian orientation of Main Street within the Plan Area. See Chapter 6 for more detail.



LSA

FIGURE IV.B-4

N

NOT TO SCALE

LEGEND

1 = Existing Study Intersection

9 = Future Study Intersection

Oakley Downtown Specific Plan EIR

Main Street Realignment Options

SOURCE: FEHR & PEERS, 2009

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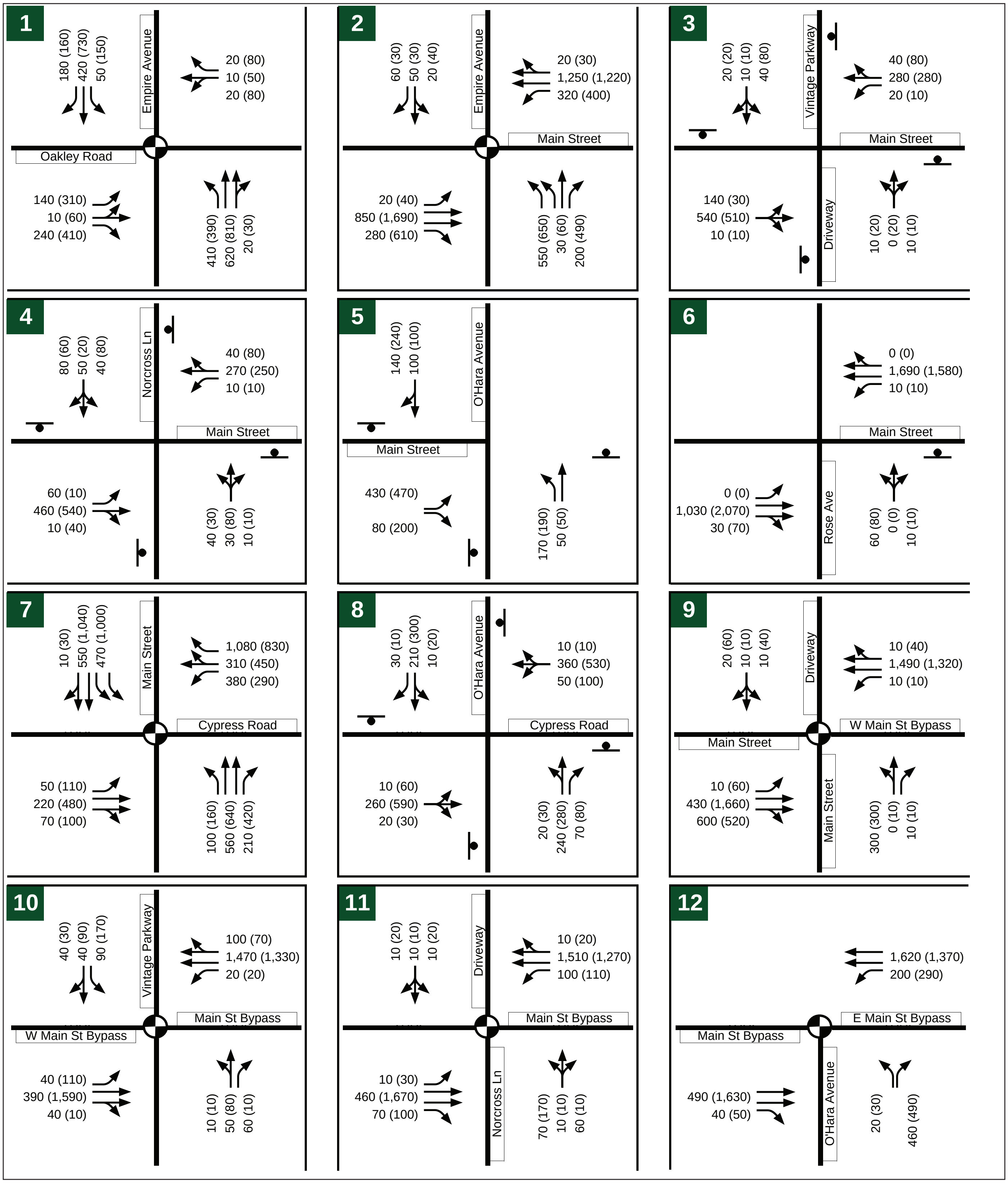

LSA

FIGURE IV.B-5

N

NOT TO SCALE

LEGEND

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

= Signalized Intersection

= Stop Sign

Oakley Downtown Specific Plan EIR

Cumulative Plus Project Peak Hour Intersection Volumes, Lane Configuration, and Traffic Control

SOURCE: FEHR & PEERS, 2009

I:\OKY0601 oakley\figures\EIR\Fig_IVB5 (8/18/09)

Table IV.B-7 summarizes the intersection LOS analysis results of the Cumulative Plus Project conditions. Tables IV.B-8 and IV.B-9 summarize the LOS analysis for the three Main Street east end alignment options using CCTALOS and HCM methods. Appendix C contains the LOS calculation worksheets. Based on thresholds presented in Table IV.B-4, the following study intersections would operate at unacceptable service levels under Cumulative Plus Project conditions:

- *Intersection #1: Oakley Road/Empire Avenue*. The signalized Oakley Road/Empire Avenue intersection would operate at unacceptable LOS E during the PM peak hour (delay = 62 seconds based on HCM). The intersection would improve from LOS F (delay > 100 seconds) during the PM peak hour under Cumulative No Project conditions. Because implementation of the proposed DTSP would reduce delay and improve traffic operations, the congestion at the Oakley Road/Empire Avenue intersection would not constitute a significant adverse impact.
- *Intersection #2: Main Street/Empire Avenue.*The signalized Main Street/Empire Avenue intersection would operate at unacceptable LOS F during the PM peak hour (v/c = 1.01 based on CCTALOS and delay = 82 seconds based on HCM). The intersection would degrade from LOS E (delay = 61 seconds) under Cumulative No Project conditions. (This significant impact is discussed in the next section and mitigation is proposed.)
- *Intersection #5: Main Street/Main Street Bypass/O'Hara Avenue.* The proposed roundabout at the Main Street/Main Street Bypass/O'Hara Avenue intersection under Option #2 would operate at unacceptable LOS F during the PM peak hour (delay > 120 seconds) under Cumulative Plus Project conditions. (This significant impact is discussed in the next section and mitigation is proposed.)
- *Intersection #6: Main Street/Rose Avenue.* The stop-controlled northbound approach at the side-street stop-controlled Main Street/Rose Avenue intersection would continue to operate at LOS F (delay > 70 seconds) during both AM and PM peak hours. Because the intersection volumes would not satisfy the MUTCD peak hour signal warrant, the proposed DTSP would not cause a significant impact at the Main Street/Rose Avenue intersection.
- *Intersection #8: West Cypress Road/O'Hara Avenue.* The all-way stop-controlled West Cypress Road/O'Hara Avenue intersection would continue to operate at unacceptable LOS F (delay > 70 seconds) during the PM peak hour. The intersection would satisfy the MUTCD peak hour signal warrant under the Cumulative Plus Project conditions. (This significant impact is discussed in the next section and mitigation is proposed.)

All other study intersections would operate at LOS D or better during both AM and PM peak hours under Cumulative Plus Project conditions.

(2) Access and Circulation. Access and circulation for vehicles, pedestrians, bicycles, transit, emergency vehicles, and trucks is discussed in this section. The Circulation Element of the *City of Oakley General Plan* and the *Oakley Long Range Roadway Plan* (LRRP) provide general roadway design guidelines, but not rigid design standards. The proposed transportation circulation system in the DTSP is generally consistent with these guidelines. The recommended design features described in the DTSP that are not consistent with these guidelines are also discussed in this section.

Table IV.B-7: Cumulative (2030) With Project Conditions Intersection Peak Hour LOS Summary

Intersection	Control[a]	Peak Hour	CCTALOS V/C Ratio[b]	CCTALOS LOS	HCM Delay[c]	HCM LOS
1. Oakley Road/Empire Avenue	Signal	AM PM	0.57 0.88	A D	25 **62**	C **E**
2. Main Street/Empire Avenue	Signal	AM PM	0.68 **1.01**	B **F**	32 **82**	C **F**
3. Main Street/Vintage Parkway	AWSC	AM PM	-- --	-- --	31 19	C C
4. Main Street/Norcross Lane	AWSC	AM PM	-- --	-- --	20 33	C D
5. Main Street/O'Hara Avenue	Varies	AM PM	See Table IV.B-8		See Table IV.B-9	
6. Main Street/Rose Avenue	SSSC	AM PM	-- --	-- --	**>70 (NB)** **>70 (NB)**	**F** **F**
7. West Cypress Road/Main Street	Signal	AM PM	0.73 0.88	C C	48 52	D D
8. West Cypress Road/O'Hara Avenue	AWSC	AM PM	-- --	-- --	27 **>70**	D **F**
9. Main Street/Main Street Bypass (West)	Signal	AM PM	0.64 0.66	A B	22 28	C C
10. Main Street Bypass/Vintage Parkway	Signal	AM PM	0.59 0.62	A B	19 25	B C
11. Main Street Bypass/Norcross Lane	Signal	AM PM	0.50 0.67	A A	11 26	B C
12. Main Street Bypass/O'Hara Avenue	Varies	AM PM	See Table IV.B-8		See Table IV.B-9	

Bold indicates intersection operating at deficient level of service.
[a] Signal = Signalized intersection
SSSC = Side-street stop-controlled intersection
AWSC = All-way stop-controlled intersection
[b] Volume-to-capacity ratio (V/C) determined for all signalized intersections using the CCTALOS method.
[c] 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, delay for worst approach (in seconds per vehicle) is presented.
Source: Fehr & Peers, 2007.

Table IV.B-8: Main Street East End Alignment Option Cumulative (2030) With Project Conditions CCTALOS LOS Analysis Summary

<table>
<tr><th rowspan="2">Intersection</th><th rowspan="2">Control[a]</th><th rowspan="2">Peak Hour</th><th colspan="2">Option 1</th><th colspan="2">Option 2</th><th colspan="2">Option 3</th></tr>
<tr><th>V/C Ratio[2]</th><th>LOS</th><th>V/C Ratio[b]</th><th>LOS</th><th>V/C Ratio[b]</th><th>LOS</th></tr>
<tr><td>5. Main Street / O'Hara Avenue</td><td>AWSC/ Round/ Signal[c]</td><td>AM
PM</td><td>-
-</td><td>-
-</td><td rowspan="2">-
-</td><td rowspan="2">-
-</td><td rowspan="2">0.66
0.83</td><td rowspan="2">C
D</td></tr>
<tr><td>12. Main Street Bypass/O'Hara Avenue</td><td>Signal</td><td>AM
PM</td><td>0.59
0.73</td><td>A
C</td></tr>
</table>

[a] Signal = Signalized intersection
AWSC = All-way stop-controlled intersection
Round = Roundabout intersection
[b] Volume-to-capacity ratio (V/C) determined for all signalized intersections using the CCTALOS method.
[c] The intersection is all-way stop-controlled under Option 1, a roundabout under Option 2, and signalized under Option 3. The two intersections are combined under Options 2 and 3.
Source: Fehr & Peers, 2009.

Table IV.B-9: Main Street East End Alignment Option Cumulative (2030) With Project Conditions HCM LOS Analysis Summary

<table>
<tr><th rowspan="2">Intersection</th><th rowspan="2">Control[a]</th><th rowspan="2">Peak Hour</th><th colspan="2">Option 1</th><th colspan="2">Option 2</th><th colspan="2">Option 3</th></tr>
<tr><th>Delay[b]</th><th>LOS</th><th>Delay[c]</th><th>LOS</th><th>Delay[b]</th><th>LOS</th></tr>
<tr><td>5. Main Street / O'Hara Avenue</td><td>AWSC/ Round/ Signal[d]</td><td>AM
PM</td><td>19
27</td><td>C
D</td><td rowspan="2">13
>120</td><td rowspan="2">B
F</td><td rowspan="2">21
34</td><td rowspan="2">C
C</td></tr>
<tr><td>12. Main Street Bypass / O'Hara Avenue</td><td>Signal</td><td>AM
PM</td><td>11
31</td><td>B
C</td></tr>
</table>

Bold indicates intersection operating at deficient level of service.

[a] Signal = Signalized intersection
AWSC = All-way stop-controlled intersection
Round = Roundabout intersection

[b] 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, delay for worst approach (in seconds per vehicle) is presented.

[c] Average delay for roundabout as calculated by SIDRA.

[d] The intersection is all-way stop-controlled under Option 1, a roundabout under Option 2, and signalized under Option 3. The two intersections are combined under Alternatives 2 and 3.

Source: Fehr & Peers, 2009.

Vehicle Access and Circulation. As shown on Figure IV.B-1, Main Street is a major arterial in the Plan Area and provides vehicular access and circulation through the Plan Area. The Main Street Bypass would be constructed just north of the Downtown Core, providing additional roadway capacity for through traffic and lessening traffic congestion on Main Street. Other side streets provide access to and from uses within the Plan Area. Planned roadway improvements for components of the vehicular circulation system in the Plan Area are discussed below.

Main Street Bypass. The DTSP proposes the construction of the Main Street Bypass to divert the heavy through and truck traffic away from Main Street in the Plan Area. It would provide for more efficient through traffic circulation on the Main Street Bypass and allow the creation of a pedestrian friendly environment on Main Street. The proposed Main Street Bypass would be constructed north of Main Street as a four lane arterial with a center median/left-turn lane, no parking lanes, and landscaping, and sidewalks on both sides of the roadway. The Main Street Bypass would intersect Main Street about midway between Gardenia Street and Vintage Parkway in the west. Three roadway options, as shown on Figure IV.B-4, are proposed for the east end of Plan Area. Norcross Lane would also be extended further north to intersect the Main Street Bypass. Based on preliminary design, the intersections of the Main Street Bypass at west end of Main Street, Vintage Parkway, Norcross Lane, and east end of Main Street (depending on the option) would be signalized. Adjacent commercial developments would have direct vehicular access to the Main Street Bypass. The number of these driveways should be minimized and they should be limited to right-in/right-out movements only.

Main Street within the Downtown Core. Since the Main Street Bypass is projected to provide adequate capacity to serve the forecasted through-traffic demand, the existing Main Street can be redesigned to create a pedestrian-scale street. The DTSP recommends interim improvements on Main Street prior to the completion of the Main Street Bypass, and ultimate improvements after the completion of the Main Street Bypass. Currently, Main Street does not have a uniform roadway width in the Plan Area; the roadway has intermittent curbs, gutters and sidewalks of various widths, and a combination of parallel or head-in parking in various sections.

In the interim condition, Main Street would be redesigned to provide a uniform cross-section while continuing to accommodate through traffic, including heavy trucks. Thus, to the extent feasible, curbs, gutters and 12-foot sidewalks could be constructed without interfering with through traffic on Main Street. Main Street would provide a consistent curb-to-curb width of 62 feet to accommodate one 15-foot travel lane and an eight-foot parking lane in each direction, with a 16-foot turn-lane/center median. This cross-section cannot be implemented on certain sections of Main Street because of existing buildings. These sections would retain the current cross-section until the completion of the Main Street Bypass. The DTSP also recommends construction of corner bulb-outs at all intersections in the Plan Area. The corner bulb-out and other design features may interfere with through truck circulation. Thus, the interim design of Main Street should be reviewed to ensure that the roadway would allow for adequate truck circulation through Downtown.

In the ultimate conditions, Main Street would continue to provide a 62-foot curb-to-curb width. Travel lanes would be narrowed to 14 feet and the center median would be widened to 18 feet to provide additional landscaping. Main Street would accommodate corner bulb-outs at all intersection corners within the Downtown core.

Since the Main Street Bypass would provide adequate capacity for through traffic in the corridor, the existing Main Street would only need to accommodate traffic generated by existing and future development in the Plan Area and adjacent neighborhoods. Based on preliminary analysis summarized in the previous chapter, the existing signals at Main Street/Vintage Parkway and Main Street/O'Hara Avenue intersections would no longer be needed. Thus, it is recommended that both intersections be converted to all-way stop-controlled intersections after the completion of the Main Street Bypass.

Main Street East. Main Street East consists of the section of Main Street just east of the Main Street Bypass. This section of Main Street currently provides one travel lane in each direction but would need to be widened to provide two travel lanes in each direction to accommodate forecasted through traffic, including trucks. The DTSP provides for widening Main Street to provide a curb-to-curb width of 62 feet to accommodate two 11-foot travel lanes in each direction, with a 10-foot center median/left turn lane, and an eight foot parking lane on south side of the roadway. The LRRP identifies this section of Main Street as a four-lane commercial arterial, and recommends an 88-foot curb-to-curb width that accommodates parking and bicycle lanes on both sides of the street. This recommended width cannot be provided because the south frontage of the roadway has already been built and further widening of the roadway would preclude future development on the north side of the roadway. Since Main Street would continue to serve as a major truck route and is identified as a future bicycle facility, it is recommended that the proposed parking lane on the south side of Main Street be eliminated to provide wider outer lanes in both directions to better accommodate trucks and bicycles. Since the DTSP identifies an off-street parking area near Main Street East, and since the adjacent uses are required to provide adequate off-street parking to meet their needs, the loss of on-street parking would not result in a parking shortage in the area.

Downtown Side Streets. The side-streets within the Plan Area, including Norcross Lane, Hall Street, Second Street, Third Street, and Acme Street, provide local access and circulation to the uses in the Plan Area. The DTSP recommends various streetscape improvements on these roadways. Generally, these side streets would provide one travel lane in each direction, with either parallel or angled parking with improvements such as sidewalks, crosswalks, and corner bulb-outs to enhance the pedestrian circulation.

Pedestrian Access and Circulation. The proposed DTSP would create a pedestrian friendly downtown environment by enhancing pedestrian access and circulation. Specific design elements of the DTSP include widening existing sidewalks, and providing new sidewalks, crosswalks, and median refuges; constructing corner bulb-outs to shorten walking distances across intersections; minimizing driveway curb-cuts to reduce vehicle/pedestrian conflicts; and providing additional pedestrian amenities such as landscaping, pedestrian-scale lighting, and fronting commercial developments.

Bicycle Circulation. As previously discussed, bicycle facilities are planned for O'Hara Avenue and Main Street. Based on design guidelines presented in the DTSP, Class II (signed and striped bicycle lanes) can be accommodated on the Main Street Bypass and O'Hara Avenue, and Class III (signed bicycle routes) can be accommodated on Main Street within the Downtown core area, but bicycle facilities can not be accommodated on Main Street, east of the Main Street Bypass. However, the previous recommendation to eliminate on-street parking on the south side of Main Street to accommodate wider travel lanes would allow Class III facilities on this portion of Main Street.

Transit Access. Tri-Delta Transit operates several bus routes on Main Street, Vintage Parkway, and O'Hara Avenue through the Plan Area. Currently, minimal transit amenities, such as bus pullouts or shelters are provided, and pedestrian access to transit can be difficult due to lack of adequate sidewalks. The design for the new Main Street Bypass and planned improvements on Main Street should be coordinated with Tri-Delta Transit to determine the appropriate location for bus pullouts and appropriate bus amenities such as shelters on Main Street. Pedestrian facilities connecting the transit stops and major destinations should be provided. The proposed project would improve pedestrian access to transit by providing new sidewalks and enhancing existing sidewalks.

Emergency Access. Factors such as number of access points, roadway width, and proximity to fire stations determine if a study area enjoys sufficient emergency access. Multiple roadways provide access to and from the Plan Area. If one of these roadways were to be blocked or obstructed, an emergency vehicle could use an alternate route to access the area. As part of the DTSP, the vehicle travel widths on many roadways within the Plan Area may be narrowed to provide sidewalks, on-street parking, medians, or corner bulb-outs. Improvement plans for each roadway should be reviewed to ensure that adequate width and turning radius is maintained on all roadways. Also, site plans for individual developments should be reviewed to ensure adequate emergency access. The project site is located in the East Contra Costa Fire Protection District and the nearest fire station is located on Second Street, just south of the Plan Area. The proximity of the fire station would allow for timely emergency response to the Plan Area. Given these considerations, the project would provide sufficient emergency access.

Truck Access and Circulation. The City of Oakley General Plan identifies Main Street as a truck route. Although the number of heavy trucks on Main Street is expected to decrease in the near future after the completion of the SR 4 Bypass freeway, Main Street would continue to function as a major truck route providing truck access for the City of Oakley and adjacent communities. The proposed interim design for Main Street within the Downtown core area prior to completion of the Main Street Bypass would continue to accommodate trucks. Through truck traffic on this portion of Main Street would be prohibited after the completion of the Main Street Bypass, as Main Street Bypass would accommodate all through truck traffic. As previously mentioned, it is recommended that the outside lanes on Main Street, east of the Main Street Bypass, be widened to better accommodate trucks.

Since the new developments in the proposed DTSP would primarily consist of smaller commercial projects, most deliveries are expected in smaller delivery vehicles. Deliveries in larger semi-trucks are expected to be minimal. To the extent possible, large semi-truck deliveries should be scheduled for off-peak periods to minimize conflicts between delivery trucks and passenger vehicles. The site plan for specific development projects within the DTSP area should be reviewed to ensure adequate truck access at project driveways and circulation within the project sites.

(3) Parking. Public parking within the Plan Area is limited to roughly 100 unmarked, curbside spaces along the neighborhood streets south of Main Street (SR 4). While the supply of parking, both public and private off-street, is adequate for the current level of development, the DTSP recommends a significant increase in the amount of public parking to provide for and encourage new development. The DTSP establishes a Downtown Parking District, the boundaries of which mirror those of the Downtown Core Area and includes the following potential new public parking facilities:

- 350 stalls north of Main Street in public parking lots and on-street parking;
- 110 curbside parking spaces along Main Street; and
- Either a 65 space surface parking lot or a 210 space three-level structure at the existing fire station site, located at the intersection of Acme Street and 2nd Street.

The DTSP stipulates that each development provide adequate parking off-street or participate in an in-lieu parking program to be established by the City. The program would allow the City to waive or reduce the off-street parking requirement for commercial developments, and instead collect an in-lieu fee to construct and operate the required parking spaces in shared facilities in the Plan Area. Shared parking is defined as use of a parking space to serve two or more individual uses without conflict or encroachment. Shared parking could occur if various uses have peak parking demands at different times or on different days, which would allow drivers for one use to park in a space that would later be used by drivers accessing the other use. Shared parking can also be used when drivers can visit various uses while parked at the same location and do not need to drive between different uses. Many central business districts and downtowns provide central shared parking facilities to reduce the overall parking supply needed in the area. Thus, the in-lieu parking program would allow higher densities of commercial development and reduce the overall parking supply in the Plan Area because the shared parking facilities would satisfy the overall parking demand, and individual developments would not necessarily need to satisfy their own individual peak parking demand.

The DTSP recommends the following minimum parking requirements for new development:

- Three parking spaces per 1,000 square feet for non-residential uses in the Downtown Core Area and Residential/Commercial Conversion Opportunity Areas. Curbside on-street parking maybe counted towards these requirements.
- Four parking spaces per 1,000 square feet for first floor non-residential and 3 parking spaces per 1,000 square feet for upper floor spaces in the Downtown Support Area.
- For multi-family dwelling units in both the Downtown Core Area and Downtown Support Area, one space will be required for one or two bedroom units, with each additional bedroom requiring 0.5 spaces.
- For single-family dwelling units in both the Downtown Core Area and Downtown Support Area, one space will be required for one or two bedroom units, with three bedrooms requiring one additional space.

These parking requirements are lower than typical suburban parking requirements. Since the Plan Area is expected to provide a variety of retail and commercial uses in a walkable environment, it is expected to have lower parking demand than typical suburban shopping centers due to the potential for shared parking between the developments. To reduce the parking supply needed in the Plan Area, it is recommended that all non-residential parking be accessible to all users and not reserved for specific developments.

Since the specific projects that would be developed in the Plan Area are not known at this time, their parking demand can not be estimated. As development applications in the Plan Area are submitted, their incremental parking demand compared to available parking supply at the time would be estimated to ensure that adequate overall parking supply is provided through the Plan Area.

The DTSP does not identify any locations for bicycle parking. Although no formal bicycle parking requirement exists, it is recommended that bicycle parking in the form of secure bicycle racks be provided throughout the Plan Area to accommodate residents, commercial employees, and customers who would bicycle to the site.

(4) Consistency with Alternative Transportation Policies. 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:

- <u>Goal 2.8</u>: Encourage projects exhibiting excellent design and sensitivity to the community, while preserving the community character of the City of Oakley.
  - <u>Policy 2.8.2</u>: The downtown should be developed at a pedestrian scale, with adequate sidewalks, street crossings, and pedestrian resources.
- <u>Goal 3.2</u>: Promote and encourage walking and bicycling
  - <u>Policy 3.2.1</u>: Promote maximum opportunities for bicycle and pedestrian circulation on existing and new roadway facilities.
  - <u>Policy 3.2.2</u>: Enhance opportunities for bicycle and pedestrian activity in new public and private development projects.
  - <u>Policy 3.2.4</u>: 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.
- <u>Goal 3.3</u>: 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.

The proposed DTSP, enhanced by the recommendations discussed in this section, would not conflict with the City's adopted alternative transportation policies and plans.

e. Significant Transportation, Circulation and Parking Impacts. Significant project impacts are discussed below. Mitigation measures are recommended to reduce potential impacts to a less-than-significant level, where feasible.

Impact TRANS-1: The addition of traffic generated by the proposed DTSP would cause the signalized Main Street/Empire Avenue intersection (Intersection #2) to operate at unacceptable LOS F during the PM peak hour under Cumulative Plus Project conditions. (S)

As shown in Table IV.B-5, the Main Street/Empire Avenue intersection would operate at an acceptable LOS D (v/c = 0.88) based on the CCTALOS method, but at an unacceptable LOS E (delay = 61 seconds) during the PM peak hour under Cumulative No Project conditions. Traffic generated by future development within the Plan Area would cause the intersection to operate at an unacceptable LOS F (v/c = 1.01 and delay = 82 seconds) during the PM peak hour, as shown in Table IV.B-7. Implementation of the following mitigation measure would reduce this impact to a less-than-significant level.

Mitigation Measure TRANS-1: The following measures shall be implemented to reduce potential impacts to the Main Street/Empire Avenue intersection:

- Add a second exclusive left-turn lane on the westbound approach of the intersection;
- Convert the exclusive southbound right-turn lane at the Oakley Road/Empire Avenue intersection to a shared through/right-turn lane; and
- Coordinate 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 the intersections of Main Street/Empire Avenue and Oakley Road/Empire Avenue is not included in any funding documents. Individual projects developed as part of the DTSP shall contribute to this mitigation by paying their 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.

The Main Street/Empire Avenue intersection would operate at LOS D (v/c = 0.90) based on the CCTALOS method and LOS D (delay = 50 seconds) based on the HCM method during the PM peak hour with implementation of these measures. (LTS)

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.

Impact TRANS-2: The addition of traffic generated by the proposed DTSP at West Cypress Road/O'Hara Avenue (Intersection #8) intersection would contribute to the unacceptable LOS F conditions during the PM peak hour under Cumulative Plus Project conditions. (S)

As shown in Table IV.B-5, the all-way stop-controlled West Cypress Road/O'Hara Avenue intersection would operate at unacceptable LOS F (delay > 70 seconds) during the PM peak hour regardless of implementation of the DTSP. Traffic generated by individual projects developed within the Plan Area would contribute to the unacceptable conditions by adding traffic to the intersection. Implementation of the following mitigation measure would reduce this impact to a less-than-significant level:

> Mitigation Measure TRANS-2: Traffic signals shall be installed at the West Cypress Road/O'Hara Avenue intersection. The forecasted AM peak hour and PM peak hour intersection volumes would satisfy the MUTCD peak hour traffic signal warrants. This signal installation is included in the City's Transportation Impact Fee Program. Projects developed as part of the DTSP shall contribute to this mitigation by paying their fair share of the cost through the payment of the City's Transportation Impact Fee.
>
> In addition, the forecast analysis shall 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 shall be investigated based on field-measured, rather than forecast, traffic data and a thorough study of traffic and roadway conditions by an engineer selected by the City. 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 shall 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.
>
> The West Cypress Road/O'Hara Avenue intersection would operate at LOS B (v/c = 0.67) based on the CCTALOS method and LOS C (delay = 31 seconds) based on the HCM method during the PM peak hour with implementation of Mitigation Measure TRANS-2. (LTS)

Impact TRANS-3: The proposed roundabout at the Main Street/Main Street Bypass/O'Hara Avenue intersection under Option #2 would operate at unacceptable LOS F conditions during the PM peak hour under Cumulative Plus Project conditions. (S)

The roundabout intersection would operate at unacceptable LOS F (delay > 120 seconds) during the PM peak hour. The relatively high traffic volumes along the Main Street Bypass would provide few gaps for vehicles on the O'Hara Avenue and Main Street approaches of the intersection to turn into the Main Street Bypass. Traffic generated by the projects developed within the Plan Area would also contribute to the unacceptable conditions by adding traffic to the intersection. If this option is selected for the Main Street Realignment, this impact would be significant and unavoidable.

Mitigation Measure TRANS-3: Mitigation of unacceptable conditions at the Main Street/Main Street Bypass/O'Hara Avenue intersection can be achieved by selecting either Option #1 or Option #3. If Option #2 is selected, the impact would remain significant and unavoidable. (SU)

Impact TRANS-4: The design of the specific development projects and roadways developed under the DTSP may result in increased hazards due to a design feature, inadequate emergency access, or conflicts with adopted alternative transportation policies, plans, or programs. (S)

As discussed previously, the design guidelines provided in the proposed DTSP would not result in a significant impact. The implementation of the DTSP would include applications of the design guidelines to individual development projects. However, implementation of the following mitigation measure would ensure that these guidelines are followed and that potential significant impacts that may result from each individual project are reduced to a less-than-significant level.

Mitigation Measure TRANS-4: The City Engineer shall review and approve of the final design plans for specific development projects and roadways to ensure the adequacy of the design. The following items shall be reviewed as part of each individual development plan as the Plan Area continues to develop:

- The number of driveways on the Main Street Bypass shall be minimized. These driveways shall be limited to right-in/right-out movements only.
- The interim improvements on Main Street, prior to the completion of the Main Street Bypass, shall be reviewed to ensure that Main Street will continue to accommodate heavy trucks.
- The currently signalized Main Street/Vintage Parkway and Main Street/O'Hara Avenue intersections shall be converted to all-way stop-controlled intersections after the completion of the Main Street Bypass.
- The design of Main Street, east of the Main Street Bypass shall be reconsidered to better accommodate trucks and bicycles. It is recommended that the proposed parking lane on the south side of the roadway be eliminated to widen the outside travel lanes.
- The design of Plan Area roadways shall be coordinated with Tri-Delta Transit to determine the location for bus pullouts and bus shelters on Main Street and to provide pedestrian access between the bus stops and the major destinations in the Plan Area.
- Roadways within the Plan Area shall provide adequate width and turning radii for emergency access vehicles.
- Development projects within the Plan Area shall be evaluated and approved only if they provide adequate emergency access.
- Development projects within the Plan Area shall be evaluated and approved only if they provide adequate truck access and circulation.
- To the extent feasible, non-residential parking shall be accessible to all users and not reserved for specific development projects.
- The incremental parking demand for each development project shall be estimated and compared to the overall parking supply to ensure adequate parking supply in the Plan Area.
- Bicycle parking shall be evaluated and development projects approved only if they provide adequate bicycle parking facilities throughout the Plan Area. (LTS)

C. AIR QUALITY

This section describes the existing air quality setting for the DTSP area and has been prepared using methodologies and assumptions recommended in the air quality impact assessment guidelines of the Bay Area Air Quality Management District (BAAQMD).[1] In keeping with these guidelines, this chapter describes existing air quality, impacts of future traffic on local carbon monoxide levels and impacts of land use related vehicular emissions that have regional effects. Mitigation measures to reduce or eliminate potentially significant air quality impacts are identified, where appropriate. Air quality modeling results are included in Appendix D.

1. Setting

The following discussion provides an overview of existing air quality conditions in the region and the Oakley area. Ambient air quality standards and the regulatory framework relating to air quality are summarized. Climate, air quality conditions, and typical air pollutant types and sources are also described.

a. Air Quality Standards, Regulatory Framework and Attainment Status. Air quality standards, the regulatory framework, and State and federal attainment status are discussed below.

(1) Air Quality Standards. Both the State and federal governments have established health-based Ambient Air Quality Standards for six air pollutants: carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), lead (Pb), and suspended particulate matter (PM). In addition, the State has set standards for sulfates, hydrogen sulfide, vinyl chloride and visibility reducing particles. These standards are designed to protect the health and welfare of the populace with a reasonable margin of safety.

In addition to primary and secondary Ambient Air Quality Standards, the State of California has established a set of episode criteria for O_3, CO, NO_2, SO_2, and PM. These criteria refer to episode levels representing periods of short-term exposure to air pollutants that actually threaten public health. Health effects are progressively more severe as pollutant levels increase from Stage One to Stage Three.

California Ambient Air Quality Standards (CAAQS) and National Ambient Air Quality Standards (NAAQS) for the criteria air pollutants are listed in Table IV.C-1. Health effects of these criteria pollutants are described in Table IV.C-2.

(2) Regulatory Framework. The BAAQMD is primarily responsible for regulating air pollution emissions from stationary sources (e.g., factories) and indirect sources (e.g., traffic associated with new development), as well as for monitoring ambient pollutant concentrations. The BAAQMD's jurisdiction encompasses seven counties—Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara and Napa—and portions of Solano and Sonoma counties. The California Air Resources Board (CARB) and the U.S. Environmental Protection Agency (EPA) regulate direct emissions from motor vehicles.

[1] Bay Area Air Quality Management District, 1999. *BAAQMD CEQA Guidelines.*

Table IV.C-1: State and Federal Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards [a]		Federal Standards [b]		
		Concentration [c]	Method [d]	Primary [c,e]	Secondary [c,f]	Method [g]
Ozone (O_3)	1-Hour	0.09 ppm (180 $\mu g/m^3$)	Ultraviolet Photometry	No federal standard	Same as Primary Standard	Ultraviolet Photometry
	8-Hour	0.07 ppm (137 $\mu g/m^3$)		0.075 ppm (147 $\mu g/m^3$)		
Respirable Particulate Matter (PM_{10})	24-Hour	50 $\mu g/m^3$	Gravimetric or Beta Attenuation	150 $\mu g/m^3$	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 $\mu g/m^3$		–		
Fine Particulate Matter ($PM_{2.5}$)	24-Hour	No Separate State Standard		35 $\mu g/m^3$	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 $\mu g/m^3$	Gravimetric or Beta Attenuation	15 $\mu g/m^3$		
Carbon Monoxide (CO)	8-Hour	9.0 ppm (10 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m^3)	None	Non-Dispersive Infrared Photometry (NDIR)
	1-Hour	20 ppm (23 mg/m^3)		35 ppm (40 mg/m^3)		
	8-Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		–		
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.03 ppm (56 $\mu g/m^3$)	Gas Phase Chemiluminescence	0.053 ppm (100 $\mu g/m^3$)	Same as Primary Standard	Gas Phase Chemiluminescence
	1-Hour	0.18 ppm (338 $\mu g/m^3$)		–		
Lead	Rolling 3-month average	-	-	0. 15 $\mu g/m^3$	Same as Primary Standard	High-Volume Sampler and Atomic Absorption
	30-day average	1.5 $\mu g/m^3$	Atomic Absorption	–	–	
	Calendar Quarter	–		1.5 $\mu g/m^3$	Same as Primary Standard	
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	–	Ultraviolet Fluorescence	0.030 ppm (80 $\mu g/m^3$)	–	Spectrophoto-metry (Pararosaniline Method)
	24-Hour	0.04 ppm (105 $\mu g/m^3$)		0.14 ppm (365 $\mu g/m^3$)	–	
	3-Hour	–		–	0.5 ppm (1300 $\mu g/m^3$)	
	1-Hour	0.25 ppm (655 $\mu g/m^3$)		–	–	
Visibility-Reducing Particles	8-Hour	Extinction coefficient of 0.23 per kilometer - visibility of 10 miles or more (0.07–30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		**No Federal Standards**		
Sulfates	24-Hour	25 $\mu g/m^3$	Ion Chromatography			
Hydrogen Sulfide	1-Hour	0.03 ppm (42 $\mu g/m^3$)	Ultraviolet Fluorescence			
Vinyl Chloride [h]	24-Hour	0.01 ppm (26 $\mu g/m^3$)	Gas Chromatography			

Source: CARB, 2008. (Notes continued on next page.)

[a] California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, suspended particulate matter—PM_{10}, $PM_{2.5}$, and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[b] National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 μg/m3 is equal to or less than one. For $PM_{2.5}$, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact U.S. EPA for further clarification and current federal policies.

[c] Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[d] Any equivalent procedure which can be shown to the satisfaction of the CARB to give equivalent results at or near the level of the air quality standard may be used.

[e] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

[f] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[g] Reference method as described by the EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the EPA.

[h] The CARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

Table IV.C-2: Health Effects of Air Pollutants

Pollutant	Health Effects	Examples of Sources
Suspended Particulate Matter ($PM_{2.5}$ and PM_{10})	• Reduced lung function • Aggravation of the effects of gaseous pollutants • Aggravation of respiratory and cardio respiratory diseases • Increased cough and chest discomfort • Reduced visibility	• Stationary combustion of solid fuels • Construction activities • Industrial processes • Atmospheric chemical reactions
Ozone (O_3)	• Breathing difficulties • Lung damage	• Formed by chemical reactions of air pollutants in the presence of sunlight; common sources are motor vehicles, industries, and consumer products
Carbon Monoxide (CO)	• Chest pain in heart patients • Headaches, nausea • Reduced mental alertness • Death at very high levels	• Any source that burns fuel such as cars, trucks, construction and farming equipment, and residential heaters and stoves
Lead (Pb)	• Organ damage • Neurological and reproductive disorders • High blood pressure	• Metals processing • Fuel combustion • Waste disposal
Nitrogen Dioxide (NO_2)	• Lung damage	• See carbon monoxide sources
Toxic Air Contaminants	• Cancer • Chronic eye, lung, or skin irritation • Neurological and reproductive disorders	• Cars and trucks, especially diesels • Industrial sources such as chrome platers • Neighborhood businesses such as dry cleaners and service stations • Building materials and products

Source: CARB and EPA, 2005.

Federal Clean Air Act. The Federal 1970 Clean Air Act authorized the establishment of national health-based air quality standards and also set deadlines for their attainment. The Federal Clean Air Act Amendments of 1990 changed deadlines for attaining National Ambient Air Quality Standards as well as the remedial actions required of areas of the nation that exceed the standards. Under the Clean Air Act, State and local agencies in areas that exceed the National Ambient Air Quality Standards are required to develop State Implementation Plans to show how they will achieve the National Ambient Air Quality Standards for O_3 by specific dates.

The Clean Air Act requires that projects receiving federal funds demonstrate conformity to the approved State Implementation Plan and local air quality attainment plan for the region. Conformity with the State Implementation Plan requirements would satisfy the Clean Air Act requirements.

Bay Area Clean Air Plan. BAAQMD, along with the other regional agencies (i.e., Association of Bay Area Governments and the Metropolitan Transportation Commission), has prepared an Ozone Attainment Plan to address the 1-hour NAAQS for ozone. Although US EPA revoked the 1-hour NAAQS, commitments made in the Ozone Attainment Plan along with emissions budgets remain valid until the region develops an attainment demonstration/maintenance plan for the 8-hour NAAQS for ozone. The region will be required to submit a maintenance plan and demonstration of attainment with a request for redesignation to EPA when the 8-hour ozone NAAQS is met. A Carbon Monoxide Maintenance Plan was approved in 1998 by US EPA, which demonstrated how NAAQS for CO standard would be maintained.

Air quality plans addressing the California Clean Air Act are developed every three years. The plans are meant to demonstrate progress toward meeting the more stringent 1-hour ozone CAAQS. The latest plan, which was adopted in January 2006, is called the *Bay Area 2005 Ozone Strategy*. This plan includes a comprehensive strategy to reduce emissions from stationary, area, and mobile sources. The plan indicates how the region would make progress toward attaining the stricter State air quality standards, as mandated by the California Clean Air Act. The plan is designed to achieve a region-wide reduction of ozone precursor pollutants through the expeditious implementation of all feasible measures. The plan proposes expanded implementation of transportation control measures (TCMs) and programs such as Spare the Air.

The clean air planning efforts for ozone will also reduce particulate matter (PM_{10} and $PM_{2.5}$), since a substantial amount of this air pollutant comes from combustion emissions such as vehicle exhaust. In addition, BAAQMD adopts and enforces rules to reduce particulate matter emissions and develops public outreach programs to educate the public to reduce PM_{10} and $PM_{2.5}$ emissions. Senate Bill (SB) 656 requires further action by CARB and air districts to reduce public exposure to PM_{10} and $PM_{2.5}$. Efforts identified by BAAQMD in response to SB 656 are primarily targeted reductions in wood smoke emissions and adoption of new rules to further reduce NO_x and particulate matter from internal combustion engines and reduce particulate matter from commercial charbroiling activities. NO_x emissions contribute to ammonium nitrate formation that resides in the atmosphere as particulate matter, so a reduction in NO_x emissions would also reduce wintertime $PM_{2.5}$ levels. The Bay Area experiences the highest PM_{10} and $PM_{2.5}$ in winter when wood smoke and ammonium nitrate contributions to particulate matter are highest.

(3) Attainment Status Designations. The California Air Resources Board is required to designate areas of the State as attainment, nonattainment or unclassified for any State standard. An "attainment" designation for an area signifies that pollutant concentrations did not violate the standard for that pollutant in that area. A "nonattainment" designation indicates that a pollutant concentration violated the standard at least once, excluding those occasions when a violation was caused by an exceptional event, as defined in the criteria. An "unclassified" designation signifies that data does not support either an attainment or nonattainment status. The California Clear Air Act divides districts into moderate, serious and severe air pollution categories, with increasingly stringent control requirements mandated for each category.

The EPA designates areas for O_3, CO, and NO_2 as either "does not meet the primary standards," or "cannot be classified" or "better than national standards." For SO_2, areas are designated as "does not meet the primary standards," "does not meet the secondary standards," "cannot be classified" or "better than national standards." In 1991, new nonattainment designations were assigned to areas that had previously been classified as Group I, II, or III for PM_{10} based on the likelihood that they would violate national PM_{10} standards. All other areas are designated "unclassified."

Table IV.C-3 provides a summary of the attainment status for the San Francisco Bay Area with respect to national and State ambient air quality standards.

b. Existing Climate and Air Quality. The following provides a discussion of the regional air quality, local climate and air quality in Oakley.

(1) Regional Air Quality. The City of Oakley is located in the San Francisco Bay Area, a large shallow air basin ringed by hills that taper into a number of sheltered valleys around the perimeter. Two primary atmospheric outlets exist. One is through the strait known as the Golden Gate, a direct outlet to the Pacific Ocean. The second extends to the northeast, along the west delta region of the Sacramento and San Joaquin Rivers.

The City of Oakley is within the jurisdiction of the BAAQMD, which regulates air quality in the San Francisco Bay Area. Air quality conditions in the San Francisco Bay Area have improved significantly since the BAAQMD was created in 1955. Ambient concentrations of air pollutants and the number of days during which the region exceeds air quality standards have fallen dramatically. Exceedances of air quality standards occur primarily during meteorological conditions conducive to high pollution levels, such as cold, windless winter nights or hot, sunny summer afternoons.

Ozone levels, measured by peak concentrations and the number of days over the State one-hour standard, have declined substantially as a result of aggressive programs by the BAAQMD and other regional, State and federal agencies. The reduction of peak concentrations represents progress in improving public health; however, the Bay Area still exceeds the State and federal standards for 8-hour ozone.

The Bay Area is considered a nonattainment area for PM_{10} relative to the State standards, but is considered an unclassified area based on the federal standard. The Bay Area has been designated as an attainment area for federal standards, but is a nonattainment area for $PM_{2.5}$ under State standards.

No exceedances of the State or federal CO standards have been recorded at any of the region's monitoring stations since 1991. The Bay Area is currently considered a maintenance area for State and federal CO standards.

Table IV.C-3: Bay Area Attainment Status

Pollutant	Averaging Time	California Standards [a]		National Standards [b]	
		Concentration	Attainment Status	Concentration[c]	Attainment Status
Ozone (O_3)	8-Hour	0.07 ppm (137 $\mu g/m^3$)	Nonattainment [h]	0.075 ppm	Nonattainment [d]
	1-Hour	0.09 ppm (180 $\mu g/m^3$)	Nonattainment	Not Applicable	Not Applicable [c]
Carbon Monoxide (CO)	8-Hour	9 ppm (10 mg/m^3)	Attainment	9 ppm (10 mg/m^3)	Attainment [f]
	1-Hour	20 ppm (23 mg/m^3)	Attainment	35 ppm (40 mg/m^3)	Attainment
Nitrogen Dioxide (NO_2)	Annual Mean	0.030 ppm (56 mg/m^3)	Attainment	0.053 ppm (100 $\mu g/m^3$)	Attainment
	1-Hour	0.18 ppm (339 $\mu g/m^3$)	Attainment	Not Applicable	Not Applicable
Suspended Particulate Matter (PM_{10})	Annual Mean	20 $\mu g/m^3$	Nonattainment [g]		
	24-Hour	50 $\mu g/m^3$	Nonattainment	150 $\mu g/m^3$	Unclassified
Suspended Particulate Matter ($PM_{2.5}$)	Annual Mean	12 $\mu g/m^3$	Nonattainment [g]	15 $\mu g/m^3$	Attainment
	24-Hour	Not Applicable	Not Applicable	35 $\mu g/m^3$ [i]	Unclassified
Sulfur Dioxide (SO_2)	Annual Mean	Not Applicable	Not Applicable	0.03 ppm (80 $\mu g/m^3$)	Attainment
	24-Hour	0.04 ppm (105 $\mu g/m^3$)	Attainment	0.14 ppm (365 $\mu g/m^3$)	Attainment
	1-Hour	0.25 ppm (655 $\mu g/m^3$)	Attainment	Not Applicable	Not Applicable

Notes: Lead (Pb) is not listed in the above table because it has been in attainment since the 1980s.
ppm = parts per million
mg/m^3 = milligrams per cubic meter
$\mu g/m^3$ = micrograms per cubic meter

[a] California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, suspended particulate matter - PM_{10}, and visibility reducing particles are values that are not to be exceeded. The standards for sulfates, Lake Tahoe carbon monoxide, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded. If the standard is for a 1-hour, 8-hour or 24-hour average (i.e., all standards except for lead and the PM_{10} annual standard), then some measurements may be excluded. In particular, measurements are excluded that CARB determines would occur less than once per year on the average. The Lake Tahoe CO standard is 6.0 ppm, a level one-half the national standard and two-thirds the state standard.

[b] National standards other than for ozone, particulates and those based on annual averages are not to be exceeded more than once a year. The 1-hour ozone standard is attained if, during the most recent three-year period, the average number of days per year with maximum hourly concentrations above the standard is equal to or less than one. The 8-hour ozone standard is attained when the 3-year average of the 4th highest daily concentrations is 0.075 ppm (75 ppb) or less. The 24-hour PM_{10} standard is attained when the 3-year average of the 99th percentile of monitored concentrations is less than 150 g/m3. The 24-hour $PM_{2.5}$ standard is attained when the 3-year average of 98th percentiles is less than 35 g/m3. Except for the national particulate standards, annual standards are met if the annual average falls below the standard at every site. The national annual particulate standard for PM_{10} is met if the 3-year average falls below the standard at every site. The annual $PM_{2.5}$ standard is met if the 3-year average of annual averages spatially-averaged across officially designed clusters of sites falls below the standard.

[c] National air quality standards are set by EPA at levels determined to be protective of public health with an adequate margin of safety.

[d] In June 2004, the Bay Area was designated as a marginal nonattainment area of the national 8- hour ozone standard. EPA lowered the national 8-hour ozone standard from 0.80 to 0.75 ppm (i.e. 75 ppb) effective May 27, 2008. EPA will issue final designations based upon the new 0.75 ppm ozone standard by March 2010.

[e] The national 1-hour ozone standard was revoked by U.S. EPA on June 15, 2005.

[f] In April 1998, the Bay Area was redesignated to attainment for the national 8-hour carbon monoxide standard.

[g] In June 2002, CARB established new annual standards for $PM_{2.5}$ and PM_{10}.

[h] The 8-hour CA ozone standard was approved by the Air Resources Board on April 28, 2005 and became effective on May 17, 2006.

[i] EPA lowered the 24-hour $PM_{2.5}$ standard from 65 g/m3 to 35 g/m3 in 2006. EPA is required to designate the attainment status of BAAQMD for the new standard by December 2009.

Source: Bay Area Air Quality Management District, 2008. Bay Area Attainment Status.

At the State level, the region is considered serious non-attainment status for ground level ozone and non-attainment status for PM_{10}. California ambient air quality standards are more stringent than the national ambient air quality standards.

(2) Local Climate and Air Quality. Air quality is a function of both local climate and local sources of air pollution. Air quality is the balance of the natural dispersal capacity of the atmosphere and emissions of air pollutants from human uses of the environment.

The DTSP area lies within the climatological subregion of the Carquinez Strait. The Carquinez Strait region runs from Rodeo to Martinez. It is the only sea-level gap between the San Francisco Bay and the Central Valley and has prevailing winds from the west. During the summer and fall months, high pressure off-shore coupled with low pressure in the Central Valley causes marine air to flow eastward through the Carquinez Strait.

Maximum summer temperatures in the subregion reach about 90 degrees. Mean minimum temperatures in the winter are in the high 30s. Temperature extremes are especially pronounced in sheltered areas farther from the moderating effects of the strait itself.

Pollutant monitoring results for the years 2006 to 2008 at the Pittsburg ambient air quality monitoring station (the closest monitoring station to Oakley) indicate that air quality in the project area has generally been good. Table IV.C-4 summarizes the last three years of published data from this monitoring station. As indicated, two exceedances of the State PM_{10} standard were recorded in 2006 and 2008 and four exceedances were recorded in 2007. No violation of federal PM_{10} standard was recorded at this station. Federal and State ozone standards have been exceeded every year. CO, SO_2, NO_2 and $PM_{2.5}$ standards were not exceeded in the project area during the three-year period.

The amount of a given air pollutant in the atmosphere is determined by the amount of pollutant released and the atmosphere's ability to transport and/or dilute that pollutant. The major determinants of transport and dilution are wind, atmospheric stability, terrain and for photochemical pollutants, sunshine.

c. Air Quality Issues. Five key air quality issues—CO hotspots, vehicle emissions, fugitive dust, odors, and construction equipment exhaust—are described below.

(1) Local Carbon Monoxide Hotspots. Local air quality is most affected by CO emissions from motor vehicles. CO is typically the pollutant of greatest concern because it is created in abundance by motor vehicles and it does not readily disperse into the air. Because CO does not readily disperse, areas of vehicle congestion can create "pockets" of high CO concentration called "hot spots." These pockets have the potential to exceed the State 1-hour standard of 20 ppm and/or the 8-hour standard of 9.0 ppm.

While CO transport is limited, it does disperse with distance from the source under normal meteorological conditions. However, under certain extreme meteorological conditions, CO concentrations near congested roadways or intersections may reach unhealthy levels affecting local sensitive receptors (e.g., residents, schoolchildren, the elderly, hospital patients, etc).

Table IV.C-4: Ambient Air Quality at the Pittsburg 10th Street Monitoring Station

Pollutant	Standard	2006	2007	2008
Carbon Monoxide (CO)				
Maximum 1 hour concentration (ppm)		1.7	2.2	1.5
Number of days exceeded:	State: > 20 ppm	0	0	0
	Federal: > 35 ppm	0	0	0
Maximum 8 hour concentration (ppm)		1.3	1.4	1.0
Number of days exceeded:	State: > 9 ppm	0	0	0
	Federal: > 9 ppm	0	0	0
Ozone (O_3)				
Maximum 1 hour concentration (ppm)		0.105	0.100	0.106
Number of days exceeded:	State: > 0.09 ppm	3	1	1
Maximum 8 hour concentration (ppm)		0.003	0.074	0.083
Number of days exceeded:	State: > 0.07 ppm	10	2	2
	Federal: > 0.08 ppm	6	0	1
Coarse Particulates (PM_{10})				
Maximum 24 hour concentration ($\mu g/m^3$)		58.9	59.0	72.7
Number of days exceeded:	State: > 50 $\mu g/m^3$	2	4	2
	Federal: > 150 $\mu g/m^3$	0	0	0
Annual arithmetic average concentration ($\mu g/m^3$)		19.9	19.4	19.0
Exceeded for the year:	State: > 20 $\mu g/m^3$	No	No	No
	Federal: > 50 $\mu g/m^3$	No	No	No
Fine Particulates ($PM_{2.5}$) [a]				
Maximum 24 hour concentration ($\mu g/m^3$)		62.1	46.2	60.3
Number of days exceeded:	Federal: > 35 $\mu g/m^3$	5	7	7
Annual arithmetic average concentration ($\mu g/m^3$)		9.3	8.4	9.3
Exceeded for the year:	State: > 12 $\mu g/m^3$	No	No	No
	Federal: > 15 $\mu g/m^3$	No	No	No
Nitrogen Dioxide (NO_2)				
Maximum 1 hour concentration (ppm)		0.052	0.051	0.056
Number of days exceeded:	State: > 0.25 ppm	0	0	0
Annual arithmetic average concentration (ppm)		0.011	0.010	0.10
Exceeded for the year:	Federal: > 0.053 ppm	No	No	No
Sulfur Dioxide (SO_2)				
Maximum 1 hour concentration (ppm)		0.025	0.021	0.19
Number of days exceeded:	State: > 0.25 ppm	0	0	0
Maximum 3 hour concentration (ppm)		0.009	0.008	0.006
Number of days exceeded:	Federal: > 0.5 ppm	0	0	0
Maximum 24 hour concentration (ppm)		0.002	0.002	0.002
Number of days exceeded:	State: > 0.04 ppm	0	0	00
	Federal: > 0.14 ppm	0	0	
Annual arithmetic average concentration (ppm)		0.002	0.002	0.002
Exceeded for the year:	Federal: > 0.030 ppm	No	No	No

Source: ARB and EPA 2009.
ppm = parts per million
$\mu g/m^3$ = micrograms per cubic meter
[a] 2975 Treat Blvd., Concord was the closest monitoring station with $PM_{2.5}$ data.

Typically, high CO concentrations are associated with roadways or intersections operating at unacceptable levels of service or with extremely high traffic volumes. In areas with high ambient background CO concentration, modeling is recommended to determine a project's effect on local CO levels.

(2) Vehicle Emissions. Long-term air emission impacts are those associated with changes in automobile travel within the City. Mobile source emissions would result from vehicle trips associated with increased vehicular travel. As is true throughout much of the United States, motor vehicle use is projected to increase substantially in the region. The BAAQMD, local jurisdictions, and other parties responsible for protecting public health and welfare will continue to seek ways of minimizing the air quality impacts of growth and development in order to avoid further exceedances of the standards.

(3) Fugitive Dust. Fugitive dust emissions are generally associated with demolition, land clearing, exposure of soils to the air, and cut and fill operations. Dust generated during construction varies substantially on a project-by-project basis, depending on the level of activity, the specific operations and weather conditions.

The EPA has developed an approximate emission factor for construction-related emissions of total suspended particulate of 1.2 tons per acre per month of activity. This factor assumes a moderate activity level, moderate silt content in soils being disturbed and a semi-arid climate. The CARB estimates that 64 percent of construction-related total suspended particulate emissions is PM_{10}. Therefore, the emission factors for uncontrolled construction-related PM_{10} emissions are 0.77 tons per acre per month or 51 pounds per acre per day.

However, construction emissions can vary greatly depending on the level of activity, the specific operations taking place, the equipment being operated, local soils, weather conditions, and other factors. There are a number of feasible control measures that can be reasonably implemented to significantly reduce PM_{10} emissions from construction.

(4) Odors. During construction, the various diesel powered vehicles that would be used would create localized odors. These odors would be temporary and are not likely to be noticeable for extended periods of time beyond the construction area. For a Plan like this, new (or intensified) land uses (e.g., restaurants) may also cause objectionable odors.

(5) Construction Equipment Exhaust. Construction activities cause combustion emissions from utility engines, heavy-duty construction vehicles, equipment hauling materials to and from construction sites and motor vehicles transporting construction crews. Exhaust emissions from construction activities vary daily as construction activity levels change. The use of construction equipment results in localized exhaust emissions.

d. General Plan Policies. The following policies and actions from the Open Space and Conservation Element of the City of Oakley General Plan that specifically address air quality are applicable to the proposed project.

- Policy OSC-6.2.1: Support the principles of reducing air pollutants through land use, transportation, and energy use planning.
- Policy OSC-6.2.2: Encourage transportation modes that minimize contaminant emissions from motor vehicle use.
- Policy OSC-6.2.3: Interpret and implement the General Plan to be consistent with the regional Bay Area Air Quality Management Plan (AQMP), as periodically updated.
- Policy OSC-6.2.4: Ensure location and design of development projects so as to conserve air quality and minimize direct and indirect emissions of air contaminants.

- Policy OSC-6.2.5: Encourage air quality improvement through educational outreach programs, such as Spare the Air Day.
- Program OSC-6.2.A: Minimize impacts of new development by reviewing development proposals for potential impacts pursuant to CEQA and the BAAQMD Air Quality Handbook. Apply land use and transportation planning techniques such as:
  - Incorporation of public transit stops;
  - Pedestrian and bicycle linkage to commercial centers, employment centers, schools, and parks;
  - Preferential parking for car pools and van pools;
  - Traffic flow improvements; and
  - Employer trip reduction programs.
- Program OSC-6.2.B: Control dust and particulate matter by implementing the BAAQMD's fugitive dust control measures, including:
  - Restricting outdoor storage of fine particulate matter;
  - Requiring liners for truck beds and covering of loads;
  - Controlling construction activities and emissions from unpaved areas; and
  - Paving areas used for vehicle maneuvering.
- Program OSC-6.2.C: Work with the Bay Area Air Quality management District (BAAQMD) and the Association of Bay Area Governments (ABAG) and, to the extent feasible, meet federal and State air quality standards for all pollutants. To ensure that new measures can be practically enforced in the region, participate in future amendments and updates of the AQMP.

2. Impacts and Mitigation Measures

This section analyzes air quality impacts that could result from implementation of the DTSP. The subsection begins with the criteria of significance, which establish the threshold for determining whether an impact is significant. The latter part of this subsection presents the impacts associated with the proposed project, and recommends mitigation measures as appropriate.

a. Criteria of Significance. Implementation of the DTSP would result in a significant impact on air quality if it would:

- Conflict with or obstruct implementation of the applicable air quality plan.
- Violate the District's air quality standards or contribute substantially to an existing or projected air quality violation by:
  - Contributing to CO concentrations exceeding the State ambient air quality standards of 9 ppm averaged over 8 hours and 20 ppm for 1 hour; or
  - Generating criteria air pollutant emissions of ROG, NO_x, or PM_{10} in excess of 15 tons per year, or 80 pounds per day.
- Frequently expose members of the public to objectionable odors.
- Expose sensitive receptors (including residential areas) or the general public to toxic air contaminants in excess of the following thresholds:
  - Probability of contracting cancer for the Maximally Exposed Individual (MEI) exceeds 10 in one million; or

  - Ground-level concentrations of non-carcinogenic toxic air contaminants would result in a Hazard Index greater than 1 for the MEI.

- Result in a cumulative air quality impact. Projects that would individually have a significant air quality impact due to project operations would also result in a cumulative air quality impact. For projects that do not individually have significant operational air quality impacts, a cumulative impact would result if the project would cause the City's General Plan to conflict with the Clean Air Plan or, if the City's General Plan is already inconsistent with the Clean Air Plan, and the project would combine with other reasonably foreseeable future projects to either: 1) exceed the BAAQMD individual operational thresholds of significance or 2) exceed the CAP population and VMT assumptions for growth in the City or County.

b. Less-Than-Significant Air Quality Impacts. The following discussion describes the less-than-significant air quality impacts associated with implementation of the DTSP.

(1) Violate Air Quality Standards. Long-term air emissions and carbon monoxide effects of traffic are described below.

Long-Term Air Emissions. New emissions associated with implementation of the DTSP derive from both direct and indirect sources. Direct emissions are generated by on-site combustion for heating building interiors and other minor sources. Most emissions would be indirect (i.e., related to auto and truck traffic generated by project land uses). Because the Specific Plan does not propose a new intensity of land use for the project area, beyond what is identified in the City's General Plan, modeling of long-term air emissions generated by the project is not recommended under the BAAQMD CEQA Guidelines. According to the BAAQMD's CEQA Guidelines,[2] planning documents, such as the DTSP should be evaluated for air quality impacts with a focus on an analysis of the plan's consistency with the most recently adopted regional air quality plan. The regional air quality plan takes into account General Plan development for each jurisdiction within its boundaries; therefore, any new development that is consistent with a City's General Plan (whether a small or large project, or plan level document) can be expected to be consistent with the regional air quality plan. A significant impact would occur if the proposed plan would conflict with population and vehicle use projections from the General Plan that was used to create the latest clean air plan. The development associated with implementation of the DTSP was envisioned and evaluated under the City of Oakley General Plan. The General Plan includes many policies and programs that set and implement standards and actions that attempt to achieve the goal of assisting in the regions attainment of clean air standards. The DTSP implements the General Plan Policies and Programs that demonstrate an effort on the part of the City of Oakley to implement all feasible measures to mitigate long-term air emissions. Therefore, the DTSP would not violate air quality standards or conflict with the latest clean air plan and no additional modeling or analysis is needed. Based on the DTSP consistency with the General Plan, the project's impact to long-term air emissions would be less than significant.

[2] Ibid. p. 51.

Carbon Monoxide Effects of Traffic. Traffic generated by the project would contribute to local carbon monoxide (CO) concentrations along roadway segments and near intersections. As previously described, because CO does not readily disperse, areas of vehicle congestion can create pockets of high CO concentrations, called "hot spots." The methodology suggested by the BAAQMD for screening CO hotspots was used to evaluate eight intersections within and adjacent to the DTSP. These intersections were selected based on peak hour level of service (LOS) modeling described in Section IV.B, Transportation, Circulation and Parking of this EIR.

The estimated CO concentrations under project conditions for the eight selected intersections are shown in Table IV.C-5. The projected 1-hour CO concentrations in Table IV.C-5 were compared to the State and federal ambient 1-hour air quality standards of 20 ppm and 35 ppm, respectively to determine if CO emissions for the project exceeded State or federal thresholds. As shown in Table IV.C-5, CO concentrations at the study intersections are not expected to exceed State, and therefore federal, standards

Table IV.C-5: Intersection CO Concentrations With the DTSP

Intersection	1-Hour CO Concentration in ppm (State Standard is 20.0 ppm)	8-Hour CO Concentration in ppm (State Standard is 9.0 ppm)
Empire Avenue/Oakley Road	4.8	2.9
Charles Way / Empire Avenue	6.1	4.2
Main Street / Rose Avenue	5.3	3.4
Main Street / Cypress Road	5.4	3.5
O'Hara Avenue / Cypress Road	4.2	2.3
Main Street Bypass/ Main Street	4.6	2.7
Vintage Parkway / Main Street Bypass	5.1	3.2
Main Street Bypass/ Norcross Lane	5.0	3.1

Source: LSA Associates, 2009.

(2) Odor Impacts. Some objectionable odors may be generated from the operation of diesel-powered construction equipment and/or asphalt paving during the project construction period. However, these odors would be short-term in nature and would not result in permanent impacts to surrounding land uses, including sensitive receptors within and adjacent to the project site.

While it is unknown what specific projects would be developed under implementation of the DTSP, some uses (e.g., fast food restaurants) could have the potential to produce odors. However, potential odor generating uses would be regulated through the City's Standard Conditions of Approval for specific use types. Therefore, the proposed project would result in a less-than-significant odor impact.

(3) Local Plan Consistency. The DTSP would implement the Oakley 2020 General Plan policies for the Downtown. It compiles the Downtown Revitalization Strategy recommendations, clarifies revitalization objectives, and defines the programs and capital improvements that the City and the Redevelopment Agency will pursue in coming years to realize the community's Downtown vision.

The proposed project would allow for increased development in the DTSP area. The land uses identified as part of the project include the development of up to 300 residential units within the Downtown. This development and increase in population was accounted for in the City's 2020 General Plan and is consistent with the population projections prepared by Association of Bay Area Governments (ABAG).

The DTSP area is served by regional freeways and local and regional bus and train transit service. While additional development associated with implementation of the project would increase the generation of local trips, this project is within a central Downtown area with locally-serving amenities which could reduce regional vehicle trips. Implementation of the DTSP is not anticipated to conflict with regional projections of population growth or the rate of growth in vehicle miles traveled in the region that were used to develop the latest CAP. As a result, it would not conflict with the 2005 Bay Area Ozone Strategy and would not delay attainment goals for the Air Basin.

(4) Toxic Air Contaminants. In 1998 CARB 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.[3] The BAAQMD identified the following types of facilities as sources for high levels of diesel exhaust: truck stop; warehouse distribution center; large retail or industry facility; high volume transit center; school with high volume bus or traffic; high volume highway; and high volume arterial/ roadway with high level of diesel traffic. High volume freeways, stationary diesel engines and facilities attracting heavy and constant diesel vehicle traffic (e.g., distribution centers and truck stops) were identified as having the highest associated risk.

Health risks from toxic air contaminants are a function of both concentration and duration of exposure. The closest major source of potential toxic air contaminants is the BNSF Railroad line that parallels the northern boundary of the DTSP area. However, trains do not stop in the DTSP area and with natural air dispersion of pollutants from the trains, the concentrations of TACs in the DTSP area would not be considerably higher than the existing ambient concentrations.

Construction activities are a source of organic gas emissions. During construction various diesel-powered vehicles and equipment would be in use. 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 distance from nearby receptors. Because of its short duration, health risks from construction emissions of diesel particulate would be considered a less-than-significant impact.

The implementation of the proposed project would not result in any new sources of TACs or be located near any existing major sources of TACs. The project would not expose sensitive receptors or the general public to substantial levels of TACs and would be considered a less-than-significant impact.

(5) Cumulative Emissions. The proposed project is located in a federal and State non-attainment area for 8-hour ozone emissions and in a State non-attainment area for PM_{10}. Emissions

[3] California Air Resources Board, *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles*, October 2000.

associated with implementation of the DTSP would not significantly increase regional air pollutant emissions. Implementation of the DTSP is not anticipated to conflict with regional projections of population growth or the rate of growth in vehicle miles traveled in the region that were used to develop the latest Clean Air Plan. As a result, it would not conflict with the Bay Area 2005 Ozone Strategy and would not delay the plan's attainment goals for the Air Basin. Therefore, implementation of the DTSP would not result in a substantial cumulative air quality impact.

(6) Projects, Criteria Pollutants and Public Health. Despite great progress in air quality improvement, approximately 146 million people nationwide lived in counties with pollution levels above the national standards in 2002. Out of the 230 nonattainment areas identified during the 1990 Clean Air Act Amendment designation process, 124 areas remain under nonattainment status or designation today. In these nonattainment areas, however, the severity of air pollution episodes has decreased. Air quality in the San Francisco Bay Area Air Basin in the past 20 years has improved steadily and dramatically, even with the increase in population and vehicles and other sources.

As shown in Table IV.C-2, long-term exposure to elevated levels of criteria pollutants could result in potential health effects. However, as stated in the thresholds of significance, emission thresholds established by the air district are used to manage total regional emissions within an air basin, based on the air basin attainment status for criteria pollutants. These emission thresholds were established for individual projects that would contribute to regional emissions and pollutant concentrations that may affect or delay the projected attainment target year for certain criteria pollutants.

Because of the conservative nature of the thresholds and the basin-wide context of individual project emissions, there is no direct correlation of a single project to localized health effects. One individual project having emissions exceeding a threshold does not necessarily result in adverse health effects for residents in the project vicinity. This condition is especially true when the criteria pollutants exceeding thresholds are those with regional effects, such as ozone precursors like NO_x and ROG.

Based on the above discussion, the potential for an individual project to significantly degrade regional air quality or contribute to significant health risk is small, even if the emission thresholds are exceeded by the project. Because of the overall improvement trend in air quality in the air basin, it is unlikely the regional air quality would worsen or health risk increase from the current condition due to emissions from an individual project.

c. Significant Air Quality Impacts. Construction dust would affect local air quality at various times during construction of the individual development projects implemented as part of the DTSP. The dry, windy climate of the area during the summer months creates a high potential for dust generation when and if underlying soils are exposed. Clearing, grading and earthmoving activities have a high potential to generate dust whenever soil moisture is low, and particularly when the wind is blowing.

Impact AIR-1: Construction period activities could generate significant dust, exhaust and organic emissions. (S)

Implementation of DTSP projects would require excavation, grading, and other site preparation work. The breaking up of pavement, excavation of soils and existing infrastructure are activities that have a high potential to generate air emissions.

Construction activities are also a source of organic gas emissions. Solvents in adhesives, non-water-based paints, thinners, some insulating materials and caulking materials would evaporate into the atmosphere and would participate in the photochemical reaction that creates urban ozone. Asphalt used in paving is also a source of organic gases for a short time after its application.

The effects of construction activities would be increased dust fall and locally elevated levels of particulates downwind of construction activity. Construction dust has the potential to create a nuisance at nearby properties or at previously completed portions of the proposed project.
The following mitigation measures include feasible measures for construction emissions identified by the BAAQMD. Implementation of the following two-part mitigation measure would reduce construction impacts of the proposed project to a less-than-significant level.

Mitigation Measure AIR-1: Consistent with guidance from the BAAQMD and General Plan Program OSC-6.2.B, the following actions shall be required of all construction contracts and specifications for individual development projects constructed within the DTSP area:

Demolition. The following controls shall be implemented during demolition:

- Water during demolition work, including the break-up of pavement and infrastructure, to control dust generation;
- Cover all trucks hauling demolition debris from the site; and
- Use dust-proof chutes to load debris into trucks whenever feasible.

Construction. The following controls shall be implemented at all construction sites:

- 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 to control dust;
- Cover all trucks hauling soil, sand, and other loose materials and require liners for truck beds;
- 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 (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 (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.);
- Diesel equipment standing idle for more than 5 minutes shall be turned off. This would include trucks waiting to deliver or receive soil, aggregate, or other bulk materials. Rotating

drum concrete trucks may keep their engines running continuously as long as they are on a construction site;

- Properly tune and maintain equipment to reduce emissions;
- Avoid staging equipment within 200 feet of residences.
- 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;
- Any temporary haul roads to soil stockpile areas shall be routed away from existing neighboring land uses.
- Water sprays shall be utilized to control dust when material is being added or removed from stockpiles. When stockpiles are undisturbed for more than one week, storage piles shall be treated with a dust suppressant or crusting agent to eliminate wind-blown dust generation.
- Install baserock at entryways for all exiting trucks, and wash off the tires or tracks of all trucks and equipment in designated areas before leaving the site; and
- Suspend excavation and grading activity when winds (instantaneous gusts) exceed 25 mph. (LTS)

D. GLOBAL CLIMATE CHANGE

CEQA requires that lead agencies consider the reasonably foreseeable adverse environmental effects of projects considered for approval. Global climate change can be considered an "effect on the environment" and an individual project or plan's incremental contribution to global climate change can have a cumulatively significant impact.

Cumulative impacts are the collective impacts of one or more past, present, or future projects, that when combined, result in adverse changes to the environment. Climate change is a global environmental problem in which: (a) any given development project contributes only a small portion of any net increase in greenhouse gases (GHGs) and (b) global growth is continuing to contribute large amounts of GHGs around the world. Therefore, this section addresses climate change primarily as a cumulative impact.

This section begins by providing general background information on climate change and meteorology. It then discusses the regulatory framework for global climate change, provides data on the existing global climate setting, and evaluates potential global GHG emissions associated with the proposed project. This section also discusses and evaluates the potential impacts of climate change on the DTSP in the City of Oakley. The information and analysis rely primarily on the Climate Action Team Final Report, Intergovernmental Panel on Climate Change (IPCC) Assessment Reports, various California Air Resources Board (ARB) staff reports, and other related global climate change documents that provide background information on the impacts of GHG emissions.

1. Setting

The following discussion provides an overview of global climate change, its causes, and potential effects, and a summary of emission sources and inventories. The regulatory framework relating to global climate change is also summarized.

a. Global Climate Change Background. A description of global climate change and its sources are provided below.

Global climate change is the observed increase in the average temperature of the Earth's atmosphere and oceans along with other significant changes in climate (such as precipitation or wind) that last for an extended period of time. The term "global climate change" is often used interchangeably with the term "global warming," but "global climate change" is preferred to "global warming" because it helps convey that there are other changes in addition to rising temperatures. Global surface temperatures have risen by 0.74°C ± 0.18°C over the last 100 years (1906 to 2005). The rate of warming over the last 50 years is almost double that over the last 100 years.[1] The prevailing scientific opinion on climate change is that most of the warming observed over the last 50 years is attributable to human activities. The increased amounts of carbon dioxide (CO_2) and other GHGs are the primary causes of the human-induced component of warming. GHGs are released by the burning of fossil fuels, land

[1] Intergovernmental Panel on Climate Change (IPCC), 2007. *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the IPCC.*

clearing, agriculture, and other activities, and lead to an increase in the greenhouse effect.[2] GHGs are present in the atmosphere naturally, are released by natural sources, or are formed from secondary reactions taking place in the atmosphere. The gases that are widely seen as the principal contributors to human-induced global climate change are:[3]

- Carbon dioxide (CO2)
- Methane (CH4)
- Nitrous oxide (N2O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulfur Hexafluoride (SF6)

Over the last 200 years, human activities have caused substantial quantities of GHGs to be released into the atmosphere. These extra emissions are increasing GHG concentrations in the atmosphere, and enhancing the natural greenhouse effect, which is believed to be causing global warming. While manmade GHGs include naturally-occurring GHGs such as CO_2, methane, and N_2O, some gases, like HFCs, PFCs, and SF_6 are completely new to the atmosphere.

Certain other gases, such as water vapor, are short-lived in the atmosphere. Others remain in the atmosphere for significant periods of time, contributing to climate change in the long term. Water vapor is excluded from the list of GHGs above because it is short-lived in the atmosphere and its atmospheric concentrations are largely determined by natural processes, such as oceanic evaporation. For the purposes of this EIR, the term “GHGs” will refer collectively to the gases listed above only.

These gases vary considerably in terms of Global Warming Potential (GWP), which is a concept developed to compare the ability of each GHG to trap heat in the atmosphere relative to another gas. The global warming potential is based on several factors, including the relative effectiveness of a gas to absorb infrared radiation and length of time that the gas remains in the atmosphere (“atmospheric lifetime”). The GWP of each gas is measured relative to carbon dioxide, the most abundant GHG. The definition of GWP for a particular GHG is the ratio of heat trapped by one unit mass of the GHG to the ratio of heat trapped by one unit mass of CO_2 over a specified time period. GHG emissions are typically measured in terms of pounds or tons of “CO_2 equivalents” (CO_2eq). Table IV.D-1 shows the GWPs for each type of GHG. For example, sulfur hexafluoride is 22,800 times more potent at contributing to global warming than carbon dioxide. The following discussion summarizes the characteristics of the six primary GHGs.

[2] The temperature on Earth is regulated by a system commonly known as the "greenhouse effect." Just as the glass in a greenhouse lets heat from sunlight in and reduce the amount of heat that escapes, greenhouse gases like carbon dioxide, methane, and nitrous oxide in the atmosphere keep the Earth at a relatively even temperature. Without the greenhouse effect, the Earth would be a frozen globe; thus, although an excess of greenhouse gas results in global warming, the *naturally occurring* greenhouse effect is necessary to keep our planet at a comfortable temperature.

[3] The greenhouse gases listed are consistent with the definition in Assembly Bill (AB) 32 (Government Code 38505), as discussed later in this section.

Table IV.D-1: Global Warming Potential of Greenhouse Gases

Gas	Atmospheric Lifetime (Years)	Global Warming Potential (100-year Time Horizon)
Carbon Dioxide	50-200	1
Methane	12	25
Nitrous Oxide	114	298
HFC-23	270	14,800
HFC-134a	14	1,430
HFC-152a	1.4	124
PFC: Tetrafluoromethane (CF_4)	50,000	7,390
PFC: Hexafluoromethane (C_2F_6)	10,000	12,200
Sulfur Hexafluoride (SF_6)	3,200	22,800

Source: IPCC, 2007. *Climate Change 2007: The Physical Science Basis*. Contribution of Working Group I to the Fourth Assessment Report of the IPCC.

(1) Carbon Dioxide (CO_2). In the atmosphere, carbon generally exists in its oxidized form, as CO_2. Natural sources of CO_2 include the respiration (breathing) of humans, animals and plants, volcanic outgassing, decomposition of organic matter and evaporation from the oceans. Human-caused sources of CO_2 include the combustion of fossil fuels and wood, waste incineration, mineral production, and deforestation. The Earth maintains a natural carbon balance and when concentrations of CO_2 are upset, the system gradually returns to its natural state through the natural processes. Natural changes to the carbon cycle work slowly, especially compared to the rapid rate at which humans are adding CO_2 to the atmosphere. Natural removal processes, such as photosynthesis by land- and ocean-dwelling plant species, cannot keep pace with this extra input of man-made CO_2, and consequently, the gas is building up in the atmosphere. The concentration of CO_2 in the atmosphere has risen about 30 percent since the late 1800s.[4]

In 2002, CO_2 emissions from fossil fuel combustion accounted for approximately 98 percent of man-made CO_2 emissions and approximately 84 percent of California's overall GHG emissions (CO_2eq). The transportation sector accounted for California's largest portion of CO_2 emissions, with gasoline consumption making up the greatest portion of these emissions. Electricity generation was California's second largest category of GHG emissions.

(2) Methane (CH_4). Methane is produced when organic matter decomposes in environments lacking sufficient oxygen. Natural sources include wetlands, termites, and oceans. Anthropogenic sources include rice cultivation, livestock, landfills and waste treatment, biomass burning, and fossil fuel combustion (burning of coal, oil, natural gas, etc.). Decomposition occurring in landfills accounts for the majority of human-generated CH_4 emissions in California, followed by enteric fermentation (emissions from the digestive processes of livestock).[5] Agricultural processes such as manure management and rice cultivation are also significant sources of manmade CH_4 in California. Methane accounted for approximately 6 percent of gross climate change emissions (CO_2eq) in California in 2002.[6]

[4] California Environmental Protection Agency. 2006. *Climate Action Team Report to Governor Schwarzenegger and the Legislature*. March.

[5] California Air Resources Board, Greenhouse Gas Inventory Data - 1990 to 2004. http://www.arb.ca.gov/cc/inventory/data/data.htm. Accessed November 2008.

[6] Ibid.

It is estimated that over 60 percent of global methane emissions are related to human-related activities.[7] As with CO_2, the major removal process of atmospheric methane – a chemical breakdown in the atmosphere – cannot keep pace with source emissions, and methane concentrations in the atmosphere are increasing.

(3) Nitrous Oxide (N_2O). Nitrous oxide is produced naturally by a wide variety of biological sources, particularly microbial action in soils and water. Tropical soils and oceans account for the majority of natural source emissions. Nitrous oxide is a product of the reaction that occurs between nitrogen and oxygen during fuel combustion. Both mobile and stationary combustion emit N_2O, and the quantity emitted varies according to the type of fuel, technology, and pollution control device used, as well as maintenance and operating practices. Agricultural soil management and fossil fuel combustion are the primary sources of human-generated N_2O emissions in California. Nitrous oxide emissions accounted for nearly 7 percent of man-made GHG emissions (CO_2eq) in California in 2002.

(4) Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), and Sulfur Hexafluoride (SF_6). HFCs are primarily used as substitutes for ozone-depleting substances regulated under the Montreal Protocol.[8] PFCs and SF_6 are emitted from various industrial processes, including aluminum smelting, semiconductor manufacturing, electric power transmission and distribution, and magnesium casting. There is no aluminum or magnesium production in California; however, the rapid growth in the semiconductor industry, which is active in California, leads to greater use of PFCs. HFCs, PFCs, and SF_6 accounted for about 3.5 percent of man-made GHG emissions (CO_2eq) in California in 2002.[9]

b. Temperature Increase. The latest projections, based on state-of-the art climate models, indicate that temperatures in California are expected to rise 3 to 10.5°F by the end of the century.[10] Because GHGs persist for a long time in the atmosphere (see Table V.D-1), accumulate over time, and are generally well-mixed, their impact on the atmosphere cannot be tied to a specific point of emission.

Climate change refers to any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer). Climate change may result from:

- Natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun
- Natural processes within the climate system (e.g., changes in ocean circulation and reduction in sunlight from the addition of GHGs and other gases to the atmosphere from volcanic eruptions)

[7] IPCC, 2007. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the IPCC.

[8] The Montreal Protocol is an international treaty that was approved on January 1, 1989, and was designated to protect the ozone layer by phasing out the production of several groups of halogenated hydrocarbons believed to be responsible for ozone depletion.

[9] California Environmental Protection Agency. 2006. *Climate Action Team Report to Governor Schwarzenegger and the Legislature*. March.

[10] California Climate Change Center, 2006. *Our Changing Climate. Assessing the Risks to California.* July.

- Human activities that change the atmosphere's composition (e.g., through burning fossil fuels) and the land surface (e.g., from deforestation, reforestation, urbanization, and desertification)

The primary effect of global climate change has been a rise in the average global tropospheric[11] temperature of 0.2°C per decade, determined from meteorological measurements worldwide between 1990 and 2005. Climate change modeling shows that further warming could occur, which would induce additional changes in the global climate system during the current century. Changes to the global climate system, ecosystems, and the environment of California could include, but are not limited to:

- The loss of sea ice and mountain snow pack, resulting in higher sea levels and higher sea surface evaporation rates with a corresponding increase in tropospheric water vapor due to the atmosphere's ability to hold more water vapor at higher temperatures;
- Rise in global average sea level primarily due to thermal expansion and melting of glaciers and ice caps in the Greenland and Antarctic ice sheets;
- Changes in weather that include widespread changes in precipitation, ocean salinity, and wind patterns, and more energetic aspects of extreme weather, including droughts, heavy precipitation, heat waves, extreme cold, and the intensity of tropical cyclones;
- Decline of the Sierra Nevada snowpack, which accounts for a significant amount of the surface water storage in California, by 70 percent to as much as 90 percent over the next 100 years;
- Increase in the number of days conducive to ozone formation by 25 to 85 percent (depending on the future temperature scenario) in high ozone areas of Los Angeles and the San Joaquin Valley by the end of the 21st century; and
- High potential for erosion of California's coastlines and seawater intrusion into the Delta and levee systems due to the rise in sea level.

c. Emissions Sources and Inventories. An emissions inventory that identifies and quantifies the primary human-generated sources and sinks of GHGs is a well-recognized and useful tool for addressing climate change. This section summarizes the latest information on global, United States, California, and local GHG emission inventories.

(1) Global Emissions. Worldwide emissions of GHGs in 2004 were 27 billion metric tons of CO_2eq per year.[12] Global estimates are based on country inventories developed as part of programs of the United Nations Framework Convention on Climate Change (UNFCCC).

(2) U.S. Emissions. In 2004, the United States emitted about 7.3 billion metric tons of CO_2eq or about 25 tons/year/person. Of the four major sectors nationwide – residential, commercial, industrial and transportation – transportation accounts for the highest amount of GHG emissions

[11] The troposphere is the zone of the atmosphere characterized by water vapor, weather, winds, and decreasing temperature with increasing altitude.

[12] Combined total of Annex I and Non-Annex I Country CO_2eq emissions. United Nations Framework Convention on Climate Change (UNFCCC), 2007. *Greenhouse Gas Inventory Data*. Information available at http://unfccc.int/ghg_data/ghg_data_unfccc/time_series_annex_i/items/3814.php and http://maindb.unfccc.int/library/view_pdf.pl?url=http://unfccc.int/resource/docs/2005/sbi/eng/18a02.pdf.

(approximately 35 to 40 percent); these emissions are entirely generated from direct fossil fuel combustion. Between 1990 and 2006, total U.S. GHG emissions rose approximately 14.7 percent.[13]

(3) State of California Emissions. According to ARB emission inventory estimates, California emitted approximately 480 million metric tons[14] of CO_2eq emissions in 2004.[15] This large number is due primarily to the sheer size of California compared to other States. By contrast, California has the fourth lowest per-capita carbon dioxide emission rate from fossil fuel combustion in the country, due to the success of its energy efficiency and renewable energy programs and commitments that have lowered the State's GHG emissions rate of growth by more than half of what it would have been otherwise.[16]

The California EPA Climate Action Team stated in its March 2006 report that the composition of gross climate change pollutant emissions in California in 2002 (expressed in terms of CO_2eq) was as follows:

- Carbon dioxide (CO2) accounted for 83.3 percent;
- Methane (CH4) accounted for 6.4 percent;
- Nitrous oxide (N2O) accounted for 6.8 percent; and
- Fluorinated gases (HFCs, PFC, and SF6) accounted for 3.5 percent.[17]

The ARB estimates that transportation is the source of approximately 38 percent of the State's GHG emissions in 2004, followed by electricity generation (both in-State and out-of-State) at 23 percent, and industrial sources at 20 percent. The remaining sources of GHG emissions are residential and commercial activities at 9 percent, agriculture at 6 percent, high global warming potential gases at 3 percent, and recycling and waste at 1 percent.[18]

ARB is responsible for developing the California Greenhouse Gas Emission Inventory. This inventory estimates the amount of GHGs emitted to and removed from the atmosphere by human activities within the State of California and supports the AB 32 Climate Change Program. ARB's current GHG emission inventory covers the years 1990-2004 and is based on fuel use, equipment activity, industrial processes, and other relevant data (e.g., housing, landfill activity, agricultural lands, etc.). The emission inventory estimates are based on the actual amount of all fuels combusted in the State, which accounts for over 85 percent of the GHG emissions within California.

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[13] U.S. Environmental Protection Agency (EPA). 2008. The U.S. Greenhouse Gas Emissions and Sinks: Fast Facts. http://www.epa.gov/climatechange/emissions/downloads/2008_GHG_Fast_Facts.pdf.

[14] A metric ton is equivalent to approximately 1.1 tons.

[15] California Air Resources Board, Greenhouse Gas Inventory Data - 1990 to 2004. http://www.arb.ca.gov/cc/inventory/data/data.htm. Accessed November 2008.

[16] California Energy Commission (CEC), 2007. Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004 - Final Staff Report, publication # CEC-600-2006-013-SF, Sacramento, CA, December 22, 2006; and January 23, 2007 update to that report.

[17] California Environmental Protection Agency. 2006. *Climate Action Team Report to Governor Schwarzenegger and the Legislature*. March.

[18] California Air Resources Board (ARB), 2008. http://www.climatechange.ca.gov/inventory/index.html. September.

ARB staff has projected 2020 unregulated GHG emissions, which represent the emissions that would be expected to occur in the absence of any GHG reduction actions. ARB staff estimates the State-wide 2020 unregulated GHG emissions will be 596 million metric tons (MMT) of CO_2eq. GHG emissions in 2020 from the transportation and electricity sectors as a whole are expected to increase, but remain at approximately 38 percent and 23 percent of total CO_2eq emissions, respectively. The industrial sector consists of large stationary sources of GHG emissions and the percentage of the total 2020 emissions is projected to be 17 percent of total CO_2eq emissions. The remaining sources of GHG emissions in 2020 are high global warming potential gases at 8 percent, residential and commercial activities at 8 percent, agriculture at 5 percent, and recycling and waste at 1 percent.[19]

(4) Bay Area Emissions. The Bay Area Air Quality Management District (BAAQMD) established a climate protection program in 2005 to acknowledge the link between climate change and air quality. BAAQMD regularly prepares inventories of criteria and toxic air pollutants to support planning, regulatory and other programs. The most recent emissions inventory estimates GHG emissions produced by the San Francisco Bay Area in 2007.[20] The inventory updates BAAQMD's previous GHG emission inventory for base year 2002, which was published November 2006.

In 2007, 102.6 million metric tons of CO_2eq of GHGs were emitted by the San Francisco Bay Area. Fossil fuel consumption in the transportation sector was the single largest source of the San Francisco Bay Area's GHG emissions in 2007. The transportation sector, including on-road motor vehicles, locomotives, ships and boats, and aircraft, contributed over 40 percent of GHG emissions in the Bay Area. The industrial and commercial sector (excluding electricity and agriculture) was the second largest contributor with 34 percent of total GHG emissions. Energy production activities such as electricity generation and co-generation were the third largest contributor with approximately 15 percent of the total GHG emissions. Off-road equipment such as construction, industrial, commercial, and lawn and garden equipment contributed 3 percent of GHG emissions.

(5) City of Oakley and Contra Costa County Emissions. There is no existing GHG emissions inventory for the City of Oakley. During 2007 and 2008, Contra Costa County conducted an emissions inventory to quantify existing emissions. The GHG emissions inventory was conducted using 2005 as the county-wide baseline year for consistency with other local governments. In 2005, county-wide GHG emissions in Contra Costa County totaled 12.3 million metric tons of CO_2eq. The majority of emissions (approximately 62 percent) in the county are related to energy use. This percentage of emissions related to energy use is even higher (approximately 79 percent) when considering only the unincorporated areas of Contra Costa County. County-wide transportation emissions are approximately 37 percent of the total emissions, which is similar to the percentage of the overall State inventory. Approximately 1 percent of emissions in the county are related to landfilling of solid waste.

d. Regulatory Framework. The regulatory framework and other governmental activities addressing GHG emissions and global climate change are discussed in this section.

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[19] California Air Resources Board (ARB), 2008. http://www.arb.ca.gov/cc/inventory/data/forecast.htm. September.

[20] Bay Area Air Quality Management District, 2008. *Source Inventory of Bay Area Greenhouse Gas Emissions.* December.

(1) Federal Regulations. There are no adopted federal regulations for GHG emissions. In February 2002, the United States government announced a comprehensive strategy to reduce the GHG intensity[21] of the American economy by 18 percent over the 10-year period from 2002 to 2012. This strategy has three basic components: (1) slowing the growth of emissions, (2) strengthening science, technology and institutions, and (3) enhancing international cooperation.[22]

To meet this goal, the federal multiagency Climate Change Science Program (CCSP) was established to investigate natural and human-induced changes in the Earth's global environmental system; to monitor, understand, and predict global change; and to provide a sound scientific basis for national and international decision-making. The federal government established the multi-agency Climate Change Technology Program (CCTP) to accelerate the development and deployment of key technologies which offer great promise to reduce GHG emissions. The CCTP works closely with CCSP to make further progress in understanding and addressing global climate change. The United States Environmental Protection Agency's (EPA's) primary role in CCSP is evaluating the potential consequences of climate variability and the effects on air quality, water quality, ecosystems, and human health in the United States.

Currently there are no adopted federal regulations to control global climate change. However, recent court cases may change the voluntary approach to address global climate change and GHG emissions. On April 2, 2007, the United States Supreme Court ruled that the EPA has the authority to regulate CO_2 emissions under the federal Clean Air Act (CAA).

Over a decade ago, most countries joined an international treaty, the United Nations Framework Convention on Climate Change (UNFCCC), to begin to consider what can be done to reduce global warming and to cope with the physical and socioeconomic effects of climate change. More recently, a number of nations have ratified an amendment to the treaty: the Kyoto Protocol, which has a more powerful effect on its signatories. Because the Kyoto Protocol will affect virtually all major sectors of the economy, it is considered to be the most far-reaching agreement on the environment and sustainable development ever adopted. Most of the world's countries eventually agreed to the Protocol, but some nations (including the United States) chose not to ratify it.

As of July 2008, 182 countries have ratified the Kyoto Protocol. Participating nations are separated into Annex 1 countries (i.e., industrialized nations) and Non-Annex 1 countries (i.e., developing nations) that have different requirements for GHG reductions. The goal of the Protocol is to achieve overall emissions reduction targets for six GHGs by 2012. The six GHGs regulated under the Protocol are CO_2, CH_4, N_2O, sulfur hexafluoride, hydrofluorocarbons, and perfluorocarbons. Each nation must reduce GHG emissions by a certain percentage below 1990 levels (e.g., 8 percent reduction for the European Union, 6 percent reduction for Japan). The average reduction target for nations participating in the Kyoto Protocol is approximately 5 percent below 1990 levels.

(2) State Regulations. In 1967, the California Legislature passed the Mulford-Carrell Act, which combined two Department of Health bureaus, the Bureau of Air Sanitation and the Motor Vehicle Pollution Control Board, to establish the ARB. Since its formation, the ARB has worked with

[21] GHG intensity measures the ratio of GHG emissions to economic output.

[22] Environmental Protection Agency. 2008. Climate Change: Basic Information. www.epa.gov/climatechange/basicinfo.html.

the public, the business sector, and local governments to find solutions to California's air pollution problems.

In a response to the transportation sector's significant contribution to California's CO_2 emissions, Assembly Bill 1493 (AB 1493, Pavley) was enacted on July 22, 2002. AB 1493 requires ARB to set GHG emission standards for passenger vehicles and light duty trucks (and other vehicles whose primary use is noncommercial personal transportation in the State) manufactured in 2009 and all subsequent model years. In setting these standards, the ARB considered cost effectiveness, technological feasibility, and economic impacts. ARB adopted the standards in September 2004. When fully phased-in, the near-term (2009 to 2012) standards would result in a reduction in GHG emissions of approximately 22 percent compared to the emissions from the 2002 fleet, while the mid-term (2013 to 2016) standards would result in a reduction of approximately 30 percent. To set its own GHG emissions limits on motor vehicles, California must receive a waiver from the EPA. However, in December 2007, the EPA denied the request from California for the waiver. In January 2008, the California Attorney General filed a petition for review of the EPA's decision in the Ninth Circuit Court of Appeals; however, no decision on that petition has been published as of January 2009. On January 26, 2009, the President issued an Executive Memorandum directing the EPA to reassess its decision to deny the waiver and to initiate any appropriate action.[23] On June 30, 2009, EPA granted the waiver of Clean Air Act preemption to California for its GHG emission standards for motor vehicles beginning with the 2009 model year. Notice of the decision was published in the Federal Register on July 8, 2009.

In June 2005, Governor Schwarzenegger established California's GHG emissions reduction targets in Executive Order S-3-05. The Executive Order established the following goals for the State of California: GHG emissions should be reduced to 2000 levels by 2010; GHG emissions should be reduced to 1990 levels by 2020; and GHG emissions should be reduced to 80 percent below 1990 levels by 2050.

California's major initiative for reducing GHG emissions is outlined in Assembly Bill 32 (AB 32), the "Global Warming Solutions Act," passed by the California State legislature on August 31, 2006. This effort aims at reducing GHG emissions to 1990 levels by 2020. The ARB has established the level of GHG emissions in 1990 at 427 million metric tons (MMT) of CO_2eq. The emissions target of 427 MMT requires the reduction of 169 MMT from the State's projected business-as-usual 2020 emissions of 596 MMT. AB 32 requires ARB to prepare a Scoping Plan that outlines the main State strategies for meeting the 2020 deadline and to reduce GHGs that contribute to global climate change. The Scoping Plan was approved by ARB on December 11, 2008, and includes measures to address GHG emission reduction strategies related to energy efficiency, water use, and recycling and solid waste, among other measures.[24] Emission reductions that are projected to result from the recommended measures in the Scoping Plan are expected to total 174 MMT of CO_2eq, which would allow California to attain the emissions goal of 427 MMT of CO_2eq by 2020. The Scoping Plan includes a range of GHG reduction actions that may include direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, and market-based mechanisms such as a

[23] Obama, President Barack. 2009. Memorandum for the Administrator of the Environmental Protection Agency. State of California Request for Waiver Under 42 U.S.C. 7543(b), the Clean Air Act. January 26.

[24] California Air Resources Board. 2008. *Climate Change Proposed Scoping Plan: a framework for change*. October.

cap-and-trade system. The Scoping Plan, even after Board approval, remains a recommendation. The measures in the Scoping Plan will not be binding until after they are adopted through the normal rulemaking process. The ARB rulemaking process includes preparation and release of each of the draft measures, public input through workshops and a public comment period, followed by an ARB Board hearing and rule adoption.

In addition to reducing GHG emissions to 1990 levels by 2020, AB 32 directed ARB and the newly created Climate Action Team (CAT) [25] to identify a list of "discrete early action GHG reduction measures" that can be adopted and made enforceable by January 1, 2010. On January 18, 2007, Governor Schwarzenegger signed Executive Order S-1-07, further solidifying California's dedication to reducing GHGs by setting a new Low Carbon Fuel Standard. The Executive Order sets a target to reduce the carbon intensity of California transportation fuels by at least 10 percent by 2020 and directs ARB to consider the Low Carbon Fuel Standard as a discrete early action measure.

In June 2007 ARB approved a list of 37 early action measures, including three discrete early action measures (Low Carbon Fuel Standard, Restrictions on High Global Warming Potential Refrigerants, and Landfill Methane Capture). [26] Discrete early action measures are measures that are required to be adopted as regulations and made effective no later than January 1, 2010, the date established by Health and Safety Code (HSC) Section 38560.5. The ARB adopted additional early action measures in October 2007 that tripled the number of discrete early action measures. These measures relate to truck efficiency, port electrification, reduction of perfluorocarbons from the semiconductor industry, reduction of propellants in consumer products, proper tire inflation, and sulfur hexafluoride (SF_6) reductions from the non-electricity sector. The combination of early action measures is estimated to reduce State-wide GHG emissions by nearly 16 MMT.[27]

To assist public agencies in the mitigation of GHG emissions or analyzing the effects of GHGs under CEQA, including the effects associated with transportation and energy consumption, Senate Bill 97 (Chapter 185, 2007) requires the Governor's Office of Planning and Research (OPR) to develop CEQA guidelines on how to minimize and mitigate a project's GHG emissions. OPR is required to prepare, develop, and transmit these guidelines on or before July 1, 2009 and the Resources Agency is required to certify and adopt them by January 1, 2010. Preliminary guidance released by OPR in June 2008 suggests that global climate change analyses in CEQA documents should be conducted for all projects that release GHGs, and that mitigation measures to reduce emissions should be incorporated into projects, to the extent feasible. On January 8, 2009, OPR released preliminary draft CEQA guideline amendments, which may be refined through a public process currently underway at the time this document was drafted. The preliminary amendments encourage lead agencies to consider many factors in performing a CEQA analysis, but preserve the discretion granted by CEQA to lead agencies in making their own determinations.

[25] CAT is a consortium of representatives from State agencies who have been charged with coordinating and implementing GHG emission reduction programs that fall outside of ARB's jurisdiction.

[26] California Air Resources Board. 2007. *Expanded List of Early Action Measures to Reduce Greenhouse Gas Emissions in California Recommended for Board Consideration*. October.

[27] California Air Resources Board. 2007. "ARB approves tripling of early action measures required under AB 32". News Release 07-46. http://www.arb.ca.gov/newsrel/nr102507.htm. October 25.

SB 375, signed into law on October 1, 2008, is intended to enhance ARB's ability to reach AB 32 goals by directing ARB to develop regional GHG emissions reduction targets to be achieved within the automobile and light truck sectors for 2020 and 2035. ARB will work with California's 18 metropolitan planning organizations to align their regional transportation, housing, and land use plans and prepare a "Sustainable Communities Strategy" to reduce the number of vehicle miles traveled in their respective regions and demonstrate the region's ability to attain its GHG reduction targets.

Additionally, SB 375 provides incentives for creating attractive, walkable, and sustainable communities and revitalizing existing communities. The bill exempts home builders from certain CEQA requirements if they build projects consistent with the new sustainable community strategies. It will also encourage the development of more alternative transportation options, to promote healthy lifestyles and reduce traffic congestion.

(3) Local Policies. The following goals, policies, and actions from the Open Space and Conservation Element of the City of Oakley General Plan that address air quality, as well as have the potential to address global climate change, are applicable to the implementation of the DTSP.

Goals

- Goal 3.7.G Review site plans and area plans to encourage mixed uses, thereby decreasing the number of vehicle trips required between uses. Promote land use patterns that maximize trip-linking opportunities. Locate mixed uses within walking or bicycling distance, and ensure that there are not physical barriers to walking and bicycling

Policies

- Policy OSC-6.2.1 Support the principles of reducing air pollutants through land use, transportation, and energy use planning.
- Policy OSC-6.2.2 Encourage transportation modes that minimize contaminant emissions from motor vehicle use.
- Policy OSC-6.2.3 Interpret and implement the General Plan to be consistent with the regional Bay Area Air Quality Management Plan (AQMP), as periodically updated.
- Policy OSC-6.2.4 Ensure location and design of development projects so as to conserve air quality and minimize direct and indirect emissions of air contaminants.
- Policy OSC-6.2.5 Encourage air quality improvement through educational outreach programs, such as Spare the Air Day.

Programs

- Program OSC-6.2.A Minimize impacts of new development by reviewing development proposals for potential impacts pursuant to CEQA and the BAAQMD Air Quality Handbook. Apply land use and transportation planning techniques such as:
  - Incorporation of public transit stops;
  - Pedestrian and bicycle linkage to commercial centers, employment centers, schools, and parks;
  - Preferential parking for car pools and van pools;
  - Traffic flow improvements; and
  - Employer trip reduction programs.

- Program OSC-6.2.C Work with the Bay Area Air Quality management District (BAAQMD) and the Association of Bay Area Governments (ABAG) and, to the extent feasible, meet federal and State air quality standards for all pollutants. To ensure that new measures can be practically enforced in the region, participate in future amendments and updates of the AQMP.

2. Impacts and Mitigation Measures

This section evaluates significant impacts to global climate change that could result from implementation of the DTSP. Mitigation measures are identified as appropriate.

a. Significance Criteria. The recommended approach for GHG analysis included in OPR's June 2008 release is to: (1) identify and quantify GHG emissions, (2) assess the significance of the impact on climate change, and (3) if significant, identify alternatives and/or mitigation measures to reduce the impact below significance.[28] Neither the CEQA statute nor Guidelines prescribe thresholds of significance or a particular methodology for performing an impact analysis; as with most environmental topics, significance criteria are left to the judgment and discretion of the lead agency.

The June 2008 OPR guidance provides some additional direction regarding planning documents as follows: "CEQA can be a more effective tool for GHG emissions analysis and mitigation if it is supported and supplemented by sound development policies and practices that will reduce GHG emissions on a broad planning scale and that can provide the basis for a programmatic approach to project-specific CEQA analysis and mitigation… For local government lead agencies, adoption of general plan policies and certification of general plan EIRs that analyze broad jurisdiction-wide impacts of GHG emissions can be part of an effective strategy for addressing cumulative impacts and for streamlining later project-specific CEQA reviews."

Pursuant to SB 97, OPR is in the process of developing guidelines for analysis of the effects of GHG emissions. As part of this process, OPR has asked ARB technical staff to recommend Statewide interim thresholds of significance for GHGs. ARB released a preliminary draft staff proposal in October 2008 that included initial suggestions for significance criteria related to industrial, commercial and residential projects. The ARB anticipates adopting the proposal in 2009 to allow coordination with OPR's efforts on global climate change.

In April 2009, proposed *CEQA Guideline* amendments released by OPR included the following direction regarding determination of significant impacts from GHG emissions (Section 15064.4):

(a) The determination of the significance of GHG emissions calls for a careful judgment by the lead agency consistent with the provisions in section 15064. A lead agency should make a good-faith effort, based on available information, to describe, calculate or estimate the amount of GHG emissions resulting from a project. A lead agency shall have discretion to determine, in the context of a particular project, whether to:

> (1) Use a model or methodology to quantify GHG emissions resulting from a project, and which model or methodology to use. The lead agency has discretion to select the model it considers most appropriate provided it supports its decision with substantial evidence. The

[28] California, State of, 2008. Governor's Office of Planning and Research. *CEQA and Climate Change: Addressing Climate Change Through California Environmental Quality Act (CEQA) Review*. June 19.

lead agency should explain the limitations of the particular model or methodology selected for use; or

(2) Rely on a qualitative analysis or performance based standards.

(b) A lead agency may consider the following when assessing the significance of impacts from GHG emissions on the environment:

(1) The extent to which the project may increase or reduce GHG emissions as compared to the existing environmental setting.

(2) Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.

(3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions. Such regulations or requirements must be adopted by the relevant public agency through a public review process and must include specific requirements that reduce or mitigate the project's incremental contribution of GHG emissions. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding compliance with the adopted regulations or requirements, an EIR must be prepared for the project.

CEQA Guidelines Section 15064(b) provides that the "determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on scientific and factual data," and further, states that an "ironclad definition of significant effect is not always possible because the significance of an activity may vary with the setting."

Some policy makers and regulators suggest that a zero emissions threshold would be appropriate when evaluating GHGs and their potential effect on climate change. Such a rule appears inconsistent with the State's approach to mitigation of climate change impacts. AB 32 does not prohibit all new GHG emissions, rather, it requires a reduction in State-wide emissions to a given level. Thus, AB 32 recognizes that GHG emissions will continue to occur; increases will result from certain activities, but reductions must occur elsewhere.

Individual projects incrementally contribute toward the potential for global climate change on a cumulative basis in concert with all other past, present, and probable future projects. While individual projects are unlikely to measurably affect global climate change, each of these projects incrementally contribute toward the potential for global climate change on a cumulative basis, in concert with all other past, present, and probable future projects. This EIR analyzes whether the DTSP's emissions should be considered cumulatively significant. The DTSP would result in a significant global climate change impact if it would:

- Hinder attainment of the State's goals of reducing GHG emissions to 1990 levels by the year 2020 as stated in the Global Warming Solutions Act of 2006. A project may be considered to help attainment of the State's goals by being consistent with an adopted Statewide 2020 GHG emissions limit or the plans, programs, and regulations adopted to implement the Global Warming Solutions Act of 2006.

- Fail to achieve increased energy efficiency or reduce overall GHG emissions from an existing facility.
- Significantly increase the consumption of fuels or other energy resources, especially fossil fuels that contribute to GHG emissions when consumed.

b. Impact Analysis. The following section provides an evaluation and analysis for the potential impacts of the project for each of the criteria of significance listed above.

(1) Greenhouse Gas Emissions. Emissions estimates for the DTSP are discussed below. GHG emissions estimates are provided herein for informational purposes only, as there is not yet an established quantified GHG emissions threshold. Bearing in mind that CEQA does not require "perfection" but instead "adequacy, completeness, and a good faith effort at full disclosure," the analysis below is based on methodologies and information available to the City at the time this EIR was prepared. Estimation of GHG emissions in the future does not account for all changes in technology that may reduce such emissions; therefore, the estimates are based on past performance and represent a scenario that is believed to be worse than that which is likely to be encountered (after energy-efficient technologies have been implemented). While information is presented below to assist the public and the City's decision makers in understanding the project's potential contribution to global climate change impacts, the information available to the City is not sufficiently detailed to allow a direct comparison between particular project characteristics and particular climate change impacts, nor between any particular proposed mitigation measure and any resulting reduction in climate change impacts.

GHG emissions associated with implementation of the DTSP would occur over the short term from construction activities, consisting primarily of emissions from equipment exhaust. There would also be long-term regional emissions associated with project-related vehicular trips and stationary source emissions, such as natural gas used for heating. Recognizing that the field of global climate change analysis is rapidly evolving, the approaches advocated most recently indicate that lead agencies should calculate, or estimate, emissions from vehicular traffic, energy consumption, water conveyance and treatment, waste generation, construction activities, and any other significant source of emissions within the project area.

GHG emissions generated by the project would predominantly consist of CO_2. In comparison to criteria air pollutants, such as ozone and PM_{10}, CO_2 emissions persist in the atmosphere for a substantially longer period of time. While emissions of other GHGs, such as CH_4, are important with respect to global climate change, emission levels of other GHGs are less dependent on the land use and circulation patterns associated with the proposed land use development project than are levels of CO_2.

Six GHG sources are described separately below. Therein GHG emissions are then compiled and presented in Table IV.D-2.

Construction Activities. Construction activities, such as site grading, utility engines, on-site heavy-duty construction vehicles, equipment hauling materials to and from the site, asphalt paving, and motor vehicles transporting the construction crew would produce combustion emissions from various sources. During construction of individual DTSP projects, GHGs would be emitted through the operation of construction equipment and from worker and builder supply vendor vehicles, each of which typically use fossil-based fuels to operate. The combustion of fossil-based fuels creates GHGs such as CO_2, CH_4, and N_2O. Furthermore, CH_4 is emitted during the fueling of heavy equipment. Exhaust emissions from on-site construction activities would vary daily as construction activity levels change.

The period throughout which construction of specific development projects envisioned by the DTSP is anticipated to occur would be approximately 2010 to 2020. Precise construction timelines are not known, and emission estimates are based on an even distribution of residential, commercial and industrial over 10 years. Using the URBEMIS 2007 model, it is estimated that the total DTSP construction emissions would be approximately 1,987 metric tons of CO_2.

The project would be required to implement the construction exhaust control measures listed in Mitigation Measure AIR-1 in Section IV.C, Air Quality. Implementation of this measure would reduce GHG emissions during the construction period.

Motor Vehicle Use. Transportation related to DTSP projects would result in GHG emissions from the combustion of fossil fuels in daily automobile and truck trips. Mobile sources (vehicle trips and miles traveled) would be the largest emission source of GHGs. Transportation is also the largest source of GHG emissions in California (approximately 38 percent of annual CO_2 emissions). For land use development projects, vehicle miles traveled (VMT) and vehicle trips are the most direct indicators of GHG emissions associated with the project. CO_2 and CH_4 emissions were estimated using trip generation data; estimates of N_2O were based on EPA emission factors.

Energy Use. Buildings represent 39 percent of U.S. primary energy use and 70 percent of electricity consumption.[29] The implementation of DTSP projects would increase the demand for electricity and natural gas due to the increased square footage of commercial development and additional dwelling units. Natural gas use results in the emissions of two GHGs: CH_4 (the major component of natural gas) and CO_2 from the combustion of natural gas. Electricity use can result in GHG production if the electricity is generated by combusting fossil fuel. California's water conveyance system is energy intensive. Preliminary estimates indicate that the total energy used to pump and treat this water exceeds 6.5 percent of the total electricity used in the State per year.[30] Greenhouse gas emissions related to electricity consumption were calculated based on data provided by the Energy Information Administration.

Water Use. Water-related energy use consumes 19 percent of California's electricity every year.[31] Energy use and related GHG emissions are based on water supply and conveyance, water treatment, water distribution, and wastewater treatment. Water use estimates were based on wastewater generation rates from the Ironhouse Sanitary District.[32]

Solid Waste Disposal. Solid waste generated by individual DTSP projects could contribute to GHG emissions in a variety of ways. Average waste generation rates from a variety of sources are

[29] United States Department of Energy. 2003. *Buildings Energy Data Book.*

[30] California Energy Commission (CEC), 2004. *Water Energy Use in California* (online information sheet) Sacramento, CA, August 24. Website: energy.ca.gov/pier/iaw/industry/water.html. Accessed July 24, 2007.

[31] California, State of, 2005. California Energy Commission. California's Water-Energy Relationship. November.

[32] Assumes wastewater flow is approximately 95 percent of water demand.

available from the California Integrated Waste Management Board.[33] Landfilling and other methods of disposal use energy for transporting and managing the waste and they produce additional GHGs to varying degrees. Landfilling, the most common waste management practice, results in the release of CH_4 from the anaerobic decomposition of organic materials. CH_4 is 25 times more potent a GHG than CO_2. In addition, many materials in landfills do not decompose fully, and the carbon that remains is sequestered in the landfill and not released into the atmosphere. To determine the net GHG emissions from landfilling, the CO_2eq emissions from CH_4 generation, carbon storage (treated as negative emissions), and transportation CO_2 emissions were considered.

Other GHG Sources. At present, there is a federal ban on CFCs; therefore, it is assumed that DTSP projects would not generate emissions of CFCs. The project may emit a small amount of HFC emissions from leakage and service of refrigeration and air conditioning equipment and from disposal at the end of the life of the equipment. However, the details regarding refrigerants to be used within the DTSP site are unknown at this time. PFCs and sulfur hexafluoride are typically used in industrial applications, none of which is anticipated to be used within the project site. Therefore, it is not anticipated that implementation of the DTSP would contribute significant emissions of these additional GHGs.

Implementation of the DTSP would generate approximately 17,600 metric tons of CO_2eq emissions per year from commercial and residential uses, as shown in Table IV.D-2. Motor vehicle emissions are the largest source of GHG emissions at approximately 70 percent of the total project emissions. Energy use, including electricity and natural gas, are the next largest category at a combined 21 percent of CO_2eq emissions. Solid waste generation and disposal is the remaining source of GHG emissions and comprise 8 percent of the total.

Table IV.D-2: Downtown DTSP Greenhouse Gas Emissions

	Emissions (Metric Tons Per Year)				
Emission Source	**CO_2**	**CH_4**	**N_2O**	**CO_2eq**	**Percent of Total**
Vehicles	12,000	0.370	1.200	12,400	70
Electricity Production	2,700	0.029	0.016	2,700	15
Natural Gas Combustion	1,100	0.021	0.02	1,100	6
Solid Waste	--	--	--	1,400	8
Total Annual Emissions	16,000	0.420	1.200	17,600	100

Note: Numbers in table may not appear to add up correctly due to rounding.
-- Estimates not available for this pollutant and/or category.
Source: LSA Associates, Inc., July 2009.

(2) Hinder Attainment of State's GHG Emission Reduction Goals. The California Environmental Protection Agency Climate Action Team (CAT) and the ARB have developed several reports to achieve the Governor's GHG targets that rely on voluntary actions of California businesses, local government and community groups, and State incentive and regulatory programs. These include the CAT's 2006 "*Report to Governor Schwarzenegger and the Legislature*," ARB's 2007 "*Expanded List of Early Action Measures to Reduce Greenhouse Gas Emissions in California*," and ARB's "*Climate Change Proposed Scoping Plan: a Framework for Change.*" The reports identify strategies

[33] California Integrated Waste Management Board, 2009. *Estimated Solid Waste Generation Rates.* http://www.ciwmb.ca.gov/wastechar/wastegenrates/.

to reduce California's emissions to the levels proposed in Executive Order S-3-05 and AB 32. Table IV.D-3 summarizes those strategies that may be applicable to the project and assesses how the DTSP complies with those strategies.

Table IV.D-3: Project Compliance with Greenhouse Gas Emission Reduction Strategies

Strategy	Project Compliance
Energy Efficiency Measures	
Energy Efficiency Maximize energy efficiency building and appliance standards, and pursue additional efficiency efforts including new technologies, and new policy and implementation mechanisms. Pursue comparable investment in energy efficiency from all retail providers of electricity in California (including both investor-owned and publicly owned utilities). **Renewables Portfolio Standard** Achieve a 33 percent renewable energy mix statewide. **Green Building Strategy** Expand the use of green building practices to reduce the carbon footprint of California's new and existing inventory of buildings.	**Compliant with Mitigation Incorporated.** The proposed project would be required to comply with the updated Title 24 standards for building construction. In addition, the project would be required to comply with Mitigation Measure GCC-1 including measures to incorporate energy efficient building design features.
Water Conservation and Efficiency Measures	
Water Use Efficiency Continue efficiency programs and use cleaner energy sources to move and treat water. Approximately 19 percent of all electricity, 30 percent of all natural gas, and 88 million gallons of diesel are used to convey, treat, distribute and use water and wastewater. Increasing the efficiency of water transport and reducing water use would reduce GHG emissions.	**Compliant with Mitigation Incorporated.** The project would be required to comply with Mitigation Measure GCC-1, including measures to increase water use efficiency.
Solid Waste Reduction Measures	
Increase Waste Diversion, Composting, and Commercial Recycling, and Move Toward Zero-Waste Increase waste diversion from landfills beyond the 50 percent mandate to provide for additional recovery of recyclable materials. Composting and commercial recycling could have substantial GHG reduction benefits. In the long term, zero-waste policies that would require manufacturers to design products to be fully recyclable may be necessary.	**Compliant.** Preliminary data available from the California Integrated Waste Management Board (CIWMB) indicates that the City of Oakley has met the 50 percent diversion rate since 2005. The most recent year of available data (2006) indicates that City of Oakley has achieved a 54 percent diversion rate.
Transportation and Motor Vehicle Measures	
Vehicle Climate Change Standards. AB 1493 (Pavley) required the State to develop and adopt regulations that achieve the maximum feasible and cost-effective reduction of GHG emissions from passenger vehicles and light duty trucks. Regulations were adopted by the ARB in September 2004. **Light-Duty Vehicle Efficiency Measures.** Implement additional measures that could reduce light-duty GHG emissions. For example, measures to ensure that tires are properly inflated can both reduce GHG emissions and improve fuel efficiency. **Adopt Heavy- and Medium-Duty Fuel and Engine Efficiency Measures**.	**Compliant.** The project does not involve the manufacture, sale, or purchase of vehicles. However, vehicles that operate within and access the project site would comply with any vehicle and fuel standards that the ARB adopts.

Table IV.D-3 *Continued*

Strategy	Project Compliance
Regulations to require retrofits to improve the fuel efficiency of heavy-duty trucks that could include devices that reduce aerodynamic drag and rolling resistance. This measure could also include hybridization of and increased engine efficiency of vehicles. **Low Carbon Fuel Standard.** ARB identified this measure as a Discrete Early Action Measure. This measure would reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020.	
Regional Transportation-Related Greenhouse Gas Targets. Develop regional greenhouse gas emissions reduction targets for passenger vehicles. Local governments will play a significant role in the regional planning process to reach passenger vehicle greenhouse gas emissions reduction targets. Local governments have the ability to directly influence both the siting and design of new residential and commercial developments in a way that reduces greenhouse gases associated with vehicle travel.	**Compliant.** Specific regional emission targets for transportation emissions do not directly apply to this project. However, the DTSP is intended to promote higher density infill development and enhance and improve the pedestrian environment, reducing reliance on automobile travel.
Other	
Measures to Reduce High Global Warming Potential (GWP) Gases. ARB has identified Discrete Early Action measures to reduce GHG emissions from the refrigerants used in car air conditioners, semiconductor manufacturing, and consumer products. ARB has also identified potential reduction opportunities for future commercial and industrial refrigeration, changing the refrigerants used in auto air conditioning systems, and ensuring that existing car air conditioning systems do not leak.	**Compliant.** New products used, sold, or serviced in the project area (after implementation of the reduction of GWP gases) would comply with future ARB rules and regulations.

Source: LSA Associates, Inc., 2009.

Impact GCC-1: Implementation of the DTSP may conflict with applicable plans, policies and regulations of other agencies to the degree that GHG reduction goals may not be met. (S)

After implementation of the following mitigation measure, implementation of the DTSP would include appropriate GHG reduction strategies and would not hinder or impede implementation of reduction goals identified in AB 32, the Governor's Executive Order S-3-05, and other strategies to help reduce GHGs to the level proposed by the Governor.

Mitigation Measure GCC-1: To the extent feasible and to the satisfaction of the City, the following measures shall be incorporated into the design and construction of the projects seeking City approval and developed as part of the DTSP:

Energy Efficiency Measures

- Design all project buildings to exceed California Building Code's Title 24 energy standard, including, but not limited to any combination of the following:
  - Increase insulation such that heat transfer and thermal bridging is minimized;
  - Limit air leakage through the structure or within the heating and cooling distribution system to minimize energy consumption; and
- Design buildings to facilitate use of solar energy for electricity, water heating and/or space heating/cooling;
- Provide a landscape and development plan for the project that takes advantage of shade, prevailing winds, and landscaping;
- Install efficient lighting and lighting control systems. Use daylight as an integral part of lighting systems in buildings;
- Install light colored "cool" roofs and cool pavements;
- Install energy efficient heating and cooling systems, appliances and equipment, and control systems; and
- Install energy-efficient, solar or light emitting diodes (LEDs) for outdoor lighting, as appropriate.

Water Conservation and Efficiency Measures

- Create water-efficient landscapes within the DTSP area, including drought tolerant landscaping;
- Install water-efficient irrigation systems and devices, such as soil moisture-based irrigation controls;
- Design buildings to be water-efficient. Install water-efficient fixtures and appliances, including low-flow faucets, dual-flush toilets and waterless urinals; and
- Restrict watering methods (e.g., prohibit systems that apply water to non-vegetated surfaces) and control runoff.

Transportation and Motor Vehicle Measures

- Provide transit facilities (e.g., bus bulbs/turnouts, benches, shelters);
- Provide bicycle lanes and/or paths, incorporated into the proposed street systems and connected to a community-wide network; and
- Provide sidewalks and/or paths, connected to adjacent land uses, transit stops, and/or community-wide network. (LTS)

(3) Fail to achieve increased energy efficiency or reduce overall greenhouse gas emissions from an existing facility. The California Energy Commission (CEC) was created by the Legislature in 1974 and is the State's primary energy policy and planning agency. The CEC has the following responsibilities:

- Forecasting future energy needs and keeping historical energy data;

- Licensing thermal power plants 50 megawatts or larger;
- Promoting energy efficiency by setting the state's appliance and building efficiency standards and working with local government to enforce those standards;
- Supporting public interest energy research that advances energy science and technology through research, development, and demonstration programs;
- Supporting renewable energy by providing market support to existing, new, and emerging renewable technologies; providing incentives for small wind and fuel cell electricity systems; and providing incentives for solar electricity systems in new home construction;
- Implementing the state's Alternative and Renewable Fuel and Vehicle Technology Program; and
- Planning for and directing state response to energy emergencies.

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Energy-efficiency measures for both electricity and natural gas can significantly reduce GHG emissions. Energy Efficiency Standards (otherwise known as "Title 24 Standards") for residential and nonresidential buildings were established in 1978 in response to a legislative mandate to reduce California's energy consumption. California's building efficiency standards (along with those for energy efficient appliances) have saved more than $56 billion in electricity and natural gas costs since 1978. The standards are updated to allow consideration and possible incorporation of new energy efficiency technologies and methods. The most recent update occurred when CEC adopted the 2008 Building Energy Efficiency Standards on April 23, 2008, and the Building Standards Commission approved them for publication on September 11, 2008. The new standards will take effect on January 1, 2010.

CEC estimates that about 12 percent of California's retail electric load is currently met with renewable resources, including wind, solar, geothermal, and small hydroelectric. California's current Renewables Portfolio Standard (RPS) is intended to increase that share to 20 percent by 2010. Increased use of renewable resources will decrease California's reliance on fossil fuels and reduce emissions of GHGs from the electricity use. The AB 32 Scoping Plan developed by ARB anticipates that California will have 33 percent of its electricity provided by renewable resources by 2020.

Existing facilities and buildings within the DTSP area were constructed to meet Building Standards at the time of their construction. Any future modifications, updates or new construction will be required to meet the new standards, and therefore, will be more energy efficient. As discussed above, energy use at these facilities will also utilize electricity generated from a higher percentage of renewable resources, resulting in lower levels of GHG emissions. Therefore, the proposed project would achieve increased energy efficiency from existing facilities and would result in a less-than-significant impact.

(4) Increase the consumption of energy resources. Pacific Gas & Electric (PG&E) currently provides gas and electric services to residences and commercial development within the City of Oakley. PG&E provides natural gas and electric service to approximately 15 million people throughout a 70,000-square-mile service area in northern and central California. Pacific Gas and Electric Company and other utilities in the state are regulated by the California Public Utilities Commission (CPUC).

The DTSP provides for continuous storefronts along Main Street and large footprint commercial development along the Main Street Realignment that could create up to 360,000 square feet of commercial space. Infill housing on the upper floors and adjacent frontages could provide up to 300 dwelling units. Implementation of the DTSP would result in increased consumption of electricity and natural gas. Based upon emission factors from the Energy Information Administration of the U.S. Department of Energy, the DTSP would require an additional 9,600 megawatt hours of electricity and 20 million standard cubic feet of natural gas per year over existing conditions.

Impact GCC-2: Implementation of the DTSP may significantly increase the consumption of energy resources. (S)

With implementation of the following mitigation measure, and applicable energy standards, the DTSP would have a less-than-significant impact regarding energy consumption. In addition to these measures, the project would be required to meet energy efficiency standards of the California Building Standards Code. The Building/Code Enforcement Division of the City of Oakley would review the design components and energy conservation measures of the individual building plans.

> Mitigation Measure GCC-2: Projects developed as part of the DTSP shall implement the energy efficiency measures listed in Mitigation Measure GCC-1. (LTS)

3. Impacts to the Proposed Project from Global Climate Change

Local temperatures could increase in time as a result of global climate change with or without the development envisioned by the proposed project. This increase in temperature could lead to other climate effects, including, but not limited to, increased flooding due to increased precipitation and runoff, and a reduction in the Sierra snowpack. At present, the extent of climate change impacts is uncertain, and more extensive monitoring of runoff and snowpack is necessary for an understanding of pending changes in hydrologic patterns. Studies indicate that increased temperatures could result in a greater portion of peak streamflows occurring earlier in the spring, with decreases in late spring and early summer.[34] These changes could have implications for water supply, flood management, and ecosystem health.

While estimates vary, sea level is expected to rise an additional 22 to 35 inches by the year 2100.[35] Although these projections are on a global scale, the rate of sea level rise along California's coast is relatively consistent with the worldwide average rate observed over the past century. Therefore, it is reasonable to assume that changes in worldwide sea level rise will also be experienced along California's coast.[36]

Studies and maps have been made available by several agencies and organizations, including the United States Geological Survey (USGS), the Pacific Institute, and the San Francisco Bay Conservation and Development Commission (BCDC), which have employed geographic information system (GIS) software to identify the shoreline areas likely to be most impacted by a one meter rise in

[34] United States Global Change Research Program. 2001. Climate Change Impacts on the United States: The Potential Consequences of Climate Variability and Change.

[35] California Climate Change Center, 2006. *Our Changing Climate. Assessing the Risks to California.* CEC-500-2006-077. July.

[36] California, State of. Department of Water Resources, 2006. *Progress on Incorporating Climate Change into Management of California's Water Resources*. July.

sea level.[37] BCDC has undertaken a Climate Change Planning project that includes goals to: (1) identify strategies for adapting to climate change, (2) develop a regional task force to inform and coordinate local governments, stakeholders, and land use planning bodies in the Bay area regarding approaches for adapting to global climate change, and (3) identify the findings and policies in the San Francisco Bay Plan pertaining to climate change and update other relevant Bay Plan policies to incorporate new information about the impacts of climate change. At this time, hazard maps developed by BCDC and the Pacific Institute do not analyze the area in the City of Oakley covered by the DTSP. However, the location of the project site (near San Francisco Bay), could expose the site to coastal hazards arising from global climate change, such as sea level rise. (For further discussion of the risks of flooding, see Appendix B, Initial Study, to this EIR, Section VIII, Hydrology and Water Quality).

Most of California's precipitation falls in the northern part of the State during the winter. A vast network of man-made reservoirs and aqueducts capture and transport water throughout the State from northern California rivers, as the greatest demand for water comes from users in the southern part of the State during the spring and summer.[38] The current distribution system relies on Sierra Nevada mountain snowpack to supply water during the dry spring and summer months. Rising temperatures, potentially compounded by decreases in precipitation, could severely reduce spring snowpack, increasing the risk of summer water shortages.

Some models predict drier conditions and decreased water flows, while others predict wetter conditions in various parts of the world. If heat-trapping emissions continue unabated, more precipitation will fall as rain instead of snow, and the snow that does fall will melt earlier, reducing the Sierra Nevada spring snowpack by as much as 70 to 90 percent over the next 100 years.

The Diablo Water District (DWD) provides water services to Oakley. The DWD purchases wholesale treated water from the Contra Costa Water District (CCWD). The CCWD receives water from the Sacramento-San Joaquin Delta under a contract with the federal Central Valley Project. In 1998 the CCWD completed construction of Los Vaqueros Reservoir, which has a storage capacity of 100,000 acre-feet. The DWD has a joint powers agreement with CCWD for 15 million gallons per day (mgd) for treated water from the Randall-Bold Water Treatment Plant and has the right to purchase an additional 15 mgd. Deliveries on the hottest days have generally not exceeded a little over 8 mgd.[39] In addition, the District is developing a groundwater supply system and currently operates four wells.[40] The DTSP implements the vision of the Oakley 2020 General Plan and would not create substantial new unanticipated water demand. The demand for water treatment has been anticipated as part of the buildout for the City of Oakley and has been analyzed within the District's Urban Water Management Plan.

Where precipitation is projected to increase in California, the increases are focused in Northern California. However, various California climate models provide mixed results regarding changes in

[37] California, State of. San Francisco Bay Conservation and Development Commission, 2009. Climate Change website. http://www.bcdc.ca.gov/planning/climate_change/climate_change.shtml.

[38] California Climate Change Center, 2006. *Our Changing Climate. Assessing the Risks to California.* July.

[39] Oakley, City of, 2006. *Community Services, Water District, History of Diablo Water District.* Website: www.ci.oakley.ca.us/html/community/utility/water.asp.

[40] Diablo Water District, op. cit., pg. 4-3.

total annual precipitation in the State through the end of this century; therefore, no conclusion on an increase or decrease can be made. Considerable uncertainties about the precise effects of climate change on California hydrology and water resources will remain until there is more precise and consistent information about how precipitation patterns, timing, and intensity will change.[41] The plans and programs implemented by the DWD and CCWD are intended to ensure that sufficient water supply will be available to all users within the region in future years.

For all of the reasons set forth above, the potential effects of climate change (e.g., sea level rise, water supply, etc.) on the proposed project would be less than significant.

[41] California, State of. Department of Water Resources, 2006. *Progress on Incorporating Climate Change into Management of California's Water Resources*. July.

E. NOISE

This section describes existing noise conditions in the vicinity of the DTSP site, describes criteria for determining the significance of noise impacts, and estimates the likely noise that would result from construction activities, vehicular traffic, aircraft, and other noise sources. Where appropriate, mitigation measures are recommended to reduce project-related noise impacts to a less-than-significant level. Noise modeling results are included in Appendix F.

1. Setting

This setting section begins with an introduction to several key concepts and terms that are used in evaluating noise. It then explains the various agencies that regulate the noise environment in the City of Oakley and summarizes key standards that are applicable to the proposed project. This setting section concludes with a description of current noise sources that affect the DTSP site and the noise conditions that are experienced in the project vicinity.

a. Characteristics of Sound. Noise is generally defined as unwanted sound. Noise consists of any sound that may produce physiological or psychological damage and/or interfere with communication, work, rest, recreation, and sleep.

To the human ear, sound has two significant characteristics: *pitch* and *loudness*. Pitch is the number of complete vibrations or cycles per second of a wave that results in the range of tone from high to low. Loudness is the strength of a sound that describes a noisy or quiet environment, and it is measured by the amplitude of the sound wave. Loudness is determined by the intensity of the sound waves combined with the reception characteristics of the human ear. Sound intensity refers to how hard the sound wave strikes an object, which in turn produces the sound's effect. This characteristic of sound can be precisely measured with instruments. The analysis of a project defines the noise environment of the project area in terms of sound intensity and its effects on adjacent sensitive land uses.

(1) Measurement of Sound. Sound intensity is measured through the A-weighted scale to correct for the relative frequency response of the human ear. That is, an A-weighted noise level de-emphasizes low and very high frequencies of sound similar to the human ear's de-emphasis of these frequencies. Unlike linear units such as inches or pounds, decibels are measured on a logarithmic scale, representing points on a sharply rising curve. Table IV.E-1 contains a list of typical acoustical terms and definitions. Table IV.E-2 shows representative outdoor and indoor noise levels in units of dBA.

A decibel (dB) is a unit of measurement which indicates the relative intensity of a sound. The 0 point on the dB scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Changes of 3 dB or less are only perceptible in laboratory environments. Audible increases in noise levels generally refer to a change of 3 dB or more, as this level has been found to be barely perceptible to the human ear in outdoor environments. Sound levels in dB are calculated on a logarithmic basis. An increase of 10 dB represents a 10-fold increase in acoustic energy, while 20 dB is 100 times more intense, 30 dB is 1,000 times more intense. Each 10-dB increase in sound level is perceived as approximately a doubling of loudness.

Table IV.E-1: Definitions of Acoustical Terms

Term	Definitions
Decibel, dB	A unit of measurement that denotes the ratio between two quantities proportional to power; the number of decibels is 10 times the logarithm (to the base 10) of this ratio.
Frequency, Hz	Of a function periodic in time, the number of times that the quantity repeats itself in one second (i.e., number of cycles per second).
A-Weighted Sound Level, dBA	The sound level obtained by use of A-weighting. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted, unless reported otherwise.
L_{01}, L_{10}, L_{50}, L_{90}	The fast A-weighted noise levels equaled or exceeded by a fluctuating sound level for 1 percent, 10 percent, 50 percent, and 90 percent of a stated time period.
Equivalent Continuous Noise Level, L_{eq}	The level of a steady sound that, in a stated time period and at a stated location, has the same A-weighted sound energy as the time-varying sound.
Community Noise Equivalent Level, CNEL	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 5 decibels to sound levels occurring in the evening from 7:00 p.m. to 10:00 p.m. and after the addition of 10 decibels to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
Day/Night Noise Level, L_{dn}	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 10 decibels to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
L_{max}, L_{min}	The maximum and minimum A-weighted sound levels measured on a sound level meter, during a designated time interval, using fast time averaging.
Ambient Noise Level	The all-encompassing noise associated with a given environment at a specified time, usually a composite of sound from many sources at many directions, near and far; no particular sound is dominant.
Intrusive	The noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Source: Harris, Cyril, 1998. *Handbook of Acoustical Measurements and Noise Control.*

As noise spreads from a source, it loses energy so that the farther away the noise receiver is from the noise source, the lower the perceived noise level would be. Geometric spreading causes the sound level to attenuate or be reduced, resulting in a 6 dB reduction in the noise level for each doubling of distance from a single point source of noise to the noise sensitive receptor of concern.

There are many ways to rate noise for various time periods, but an appropriate rating of ambient noise affecting humans also accounts for the annoying effects of sound. The equivalent continuous sound level (L_{eq}) is the total sound energy of time varying noise over a sample period. The predominant rating scales for human communities in the State of California are the L_{eq}, the community noise equivalent level (CNEL), and the day-night average level (L_{dn}) based on A-weighted decibels (dBA). CNEL is the time varying noise over a 24-hour period, with a 5 dBA weighting factor applied to the hourly L_{eq} for noises occurring from 7:00 p.m. to 10:00 p.m. (defined as relaxation hours) and a 10 dBA weighting factor applied to noise occurring from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours). L_{dn} is similar to the CNEL scale, but without the adjustment for events occurring during the evening relaxation hours. CNEL and L_{dn} are within 1 dBA of each other and are normally exchangeable. The noise adjustments are added to the noise events occurring during the more sensitive hours. Typical A-weighted sound levels from various sources are described in Table IV.E-2.

Table IV.E-2: Typical A-Weighted Sound Levels

Noise Level	Extremes	Home Appliances at 10 feet	Speech at 3 feet	Motor Vehicles at 50 feet	Railroad Operations at 100 feet	General Type of Community Environment
120	Commercial Jet Aircraft at 500 ft					
110						
100				Sirens	Horns	
90				Diesel Truck (Not Muffled)		
80		Shop Tools	Shout	Diesel Truck (Muffled)	Locomotive at 50 mph	
70		Vacuum Cleaner	Loud Voice	Automobile at 70 mph	Rail Cars at 50 mph Locomotive Idling	Major Metropolis (Daytime)
60		Dishwasher	Normal Voice	Automobile at 40 mph		Urban (Daytime)
50		Air Conditioner	Normal Voice (Back to Listener)	Automobile at 20 mph		Suburban (Daytime)
40		Refrigerator				Rural (Daytime)
30						
20						
10						
0	Threshold of Hearing					

Source: Compiled by LSA Associates, Inc., 2009.

Other noise rating scales of importance when assessing the annoyance factor include the maximum noise level (L_{max}), which is the highest exponential time-averaged sound level that occurs during a stated time period. The noise environments discussed in this analysis are specified in terms of maximum levels denoted by L_{max} for short-term noise impacts. L_{max} reflects peak operating conditions, and addresses the annoying aspects of intermittent noise.

Noise standards in terms of percentile exceedance levels, L_n, are often used together with the L_{max} for noise enforcement purposes. When specified, the percentile exceedance levels are not to be exceeded by an offending sound over a stated time period. For example, the L_{10} noise level represents the level exceeded ten percent of the time during a stated period. The L_{50} noise level represents the median noise level. Half the time the noise level exceeds this level, and half the time it is less than this level. The L_{90} noise level represents the noise level exceeded 90 percent of the time and is considered the lowest noise level experienced during a monitoring period. It is normally referred to as the background noise level. For a relatively steady noise, the measured L_{eq} and L_{50} are approximately the same.

Noise impacts can be described in three categories. The first is audible impacts that refer to increases in noise levels noticeable to humans. Audible increases in noise levels generally refer to a change of 3.0 dBA or greater, since, as described earlier, this level has been found to be barely perceptible in exterior environments. The second category, potentially audible, refers to a change in the noise level between 1.0 and 3.0 dBA. This range of noise levels has been found to be noticeable only in laboratory environments. The last category is a change in noise level of less than 1.0 dBA that is inaudible to the human ear. Only audible changes in existing ambient or background noise levels are considered potentially significant.

(2) Physiological Effects of Noise. Physical damage to human hearing begins at prolonged exposure to noise levels higher than 85 dBA. Exposure to high noise levels affects the entire human system, with prolonged noise exposure in excess of 75 dBA increasing body tensions, and thereby affecting blood pressure, functions of the ear, and the nervous system. In comparison, extended periods of noise exposure above 90 dBA would result in permanent cell damage. When the noise level reaches 120 dBA, a tickling sensation occurs in the human ear even with short-term exposure. This level of noise is called the threshold of feeling.

b. Characteristics of Groundborne Vibration. Vibrating objects in contact with the ground radiate vibration waves through various soil and rock strata to the foundations of nearby buildings. As the vibration propagates from the foundation throughout the remainder of the building, the vibration of floors and walls may cause perceptible vibration from the rattling of windows or a rumbling noise. The rumbling sound caused by the vibration of room surfaces is called groundborne noise. When assessing annoyance from groundborne noise, vibration is typically expressed as root mean square (rms) velocity in units of decibels of 1 micro-inch per second. To distinguish vibration levels from noise levels, the unit is written as “VdB.” Human perception to vibration starts at levels as low as 67 VdB and sometimes lower. Annoyance due to vibration in residential settings starts at approximately 70 VdB. Groundborne vibration is almost never annoying to people who are outdoors. Although the motion of the ground may be perceived, without the effects associated with the shaking of the building, the motion does not provoke the same adverse human reaction.

Common sources of groundborne vibration include trains and construction activities such as blasting, pile driving and operating heavy earthmoving equipment. Typical vibration source levels from construction equipment are shown in Table IV.E-3. Although the table gives one level for each piece of equipment, it should be noted that there is a considerable variation in reported ground vibration levels from construction activities. The data do provide a reasonable estimate for a wide range of soil conditions. In extreme cases, excessive groundborne vibration has the potential to cause structural damage to buildings. The damage threshold for buildings considered of particular historical significance or that are particularly fragile structures is approximately 96 VdB; the damage threshold for other structures is 100 VdB.[1]

Table IV.E-3: Typical Vibration Source Levels for Construction Equipment

Equipment		Approximate VdB at 25 feet
Pile Driver (impact)	Upper range	112
	Typical	104
Pile Driver (sonic)	Upper range	105
	Typical	93
Clam shovel drop (slurry wall)		94
Hydromill (slurry wall)	In soil	66
	In rock	75
Vibratory roller		94
Hoe ram		87
Large bulldozer		87
Caisson drilling		87
Loaded trucks		86
Jackhammer		79
Small bulldozer		58

Source: Federal Transit Administration, 2006. *Transit Noise and Vibration Impact Assessment.* May.

c. Noise Regulatory Framework. The following section provides brief discussions of the regulatory framework related to noise.

(1) U.S. Environmental Protection Agency (EPA). In 1972 Congress enacted the Noise Control Act. This act authorized the EPA to publish descriptive data on the effects of noise and establish levels of sound "requisite to protect the public welfare with an adequate margin of safety." These levels are separated into health impact levels (hearing loss levels) and welfare impact levels (annoyance levels) as shown in Table IV.E-4. The EPA cautions that these identified levels are not standards because they do not take into account the cost or feasibility of the levels. For protection against hearing loss, 96 percent of the population would be protected if sound levels are less than or equal to an $L_{eq(24)}$ of 70 dB. The "(24)" signifies an L_{eq} duration of 24 hours. The EPA activity and interference guidelines are designed to ensure reliable speech communication at about 5 feet in the outdoor environment. For outdoor and indoor environments, interference with activity and annoyance should not occur if levels are below 55 dBA and 45 dBA, respectively.

Table IV.E-4: Summary of EPA Noise Levels for Protection of Public Health and Welfare with an Adequate Margin of Safety

Effect	Level	Area
Hearing loss	$L_{eq(24)} \leq 70$ dB	All areas.
Outdoor activity interference and annoyance	$L_{dn} \leq 55$ dB	Outdoors in residential areas and farms and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use.
	$L_{eq(24)} \leq 55$ dB	Outdoor areas where people spend limited amounts of time, such as school yards, play-grounds, etc.
Indoor activity interference and annoyance	$L_{eq} \leq 45$ dB	Indoor residential areas.
	$L_{eq(24)} \leq 45$ dB	Other indoor areas with human activities such as schools, etc.

Source: U.S. Environmental Protection Agency, 1974. "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety." March.

The noise effects associated with an outdoor L_{dn} of 55 dB are summarized in Table IV.E-5. At 55 dB L_{dn}, 95 percent sentence clarity (intelli-gibility) may be expected at 3.5 meters, with generally no community reaction. However, 1 percent of the population may complain about noise at this level and 17 percent may indicate annoyance.

(2) State of California. The State of California has established regulations that help prevent adverse impacts to occupants of buildings located near noise sources. Referred to as the "State Noise Insulation Standard," it requires buildings to meet performance standards through design and/or the use of building materials that would offset any noise source in the vicinity of the receptor. State regulations include requirements for the construction of new hotels, motels, apartment houses, and dwellings other than detached single-family dwellings that are intended to limit the extent of noise

[1] Harris, C.M. 1998. *Handbook of Acoustical Measurements and Noise Control.*

transmitted into habitable spaces. These requirements are found in the California Code of Regulations, Title 24 (known as the Building Standards Administrative Code), Part 2 (known as the California Building Code), Appendix Chapters 12 and 12A. For limiting noise transmitted between adjacent dwelling units, the noise insulation standards specify the extent to which walls, doors, and floor ceiling assemblies must block or absorb sound. For limiting noise from exterior noise sources, the noise insulation standards set an interior standard of 45 dBA L_{dn} in any habitable room with all doors and windows closed. In addition, the standards require preparation of an acoustical analysis demonstrating the manner in which dwelling units have been designed to meet this interior standard, where such units are proposed in an area with exterior noise levels greater than 60 dBA L_{dn}.

The State has also established land use compatibility guidelines for determining acceptable noise levels for specified land uses.[2] The City has adopted and modified the State's land use compatibility guidelines as shown in Table IV.E-9 and discussed below.

(3) Local Regulations. The City of Oakley addresses noise in the Noise Element of the General Plan[3] and in Chapter 4.2 of the Municipal Code.[4] As shown in Table IV.E-6, the Noise Element of the General Plan includes maximum allowable noise exposure thresholds from transportation noise sources. These standards include a maximum allowable noise exposure of 65 dBA CNEL for new sensitive land uses including residential, transient lodging, hospitals, nursing homes, churches and meeting halls. The City has

Table IV.E-5: Summary of Human Effects in Areas Exposed to 55 dBA Ldn

Type of Effects	Magnitude of Effect
Speech – Indoors	100 percent sentence intelligibility (average) with a 5 dB margin of safety.
Speech – Outdoors	100 percent sentence intelligibility (average) at 0.35 meters. 99 percent sentence intelligibility (average) at 1.0 meters. 95 percent sentence intelligibility (average) at 3.5 meters.
Average Community Reaction	None evident; 7 dB below level of significant complaints and threats of legal action and at least 16 dB below "vigorous action."
Complaints	1 percent dependent on attitude and other non-level related factors.
Annoyance	17 percent dependent on attitude and other non-level related factors.
Attitude Towards Area	Noise essentially the least important of various factors.

Source: U.S. Environmental Protection Agency, 1974. "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety." March.

Table IV.E-6: Maximum Allowable Noise Exposure From Transportation Noise Sources

Land Use	Outdoor Activity Areas[a]/L_{dn}/ CNEL, dB	Interior Spaces L_{dn}/ CNEL,dB	Interior Spaces L_{eq}, dB[b]
Residential	65	45	--
Transient Lodging	65[c]	45	--
Hospitals, Nursing Homes	65	45	--
Theaters, Auditoriums, Music Halls	--	--	35
Churches, Meeting Halls	65	--	40
Office Buildings	--	--	45
Schools, Libraries, Museums	--	--	45
Playgrounds, Neighborhood Parks	70	--	--

[a] Where the location of outdoor activity areas is unknown, the exterior noise level standard shall be applied to the property line of the receiving land use. Where it is not practical to mitigate exterior noise levels at patio or balconies of apartment complexes, a common area such as a pool or recreation area may be designated as the outdoor activity area.
[b] As determined for a typical worst-case hour during periods of use.
[c] In the case of hotel/motel facilities or other transient lodging, outdoor activity areas such as pool areas may not be included in the project design. In these cases, only the interior noise level criterion will apply.
Source: Oakley, City of, 2002. *Oakley 2020 General Plan.* December 16.

[2] State of California, 1998. Governor's Office of Planning and Research, *General Plan Guidelines.* (Appendix A, Figure 2).

[3] Oakley, City of, 2002. *Oakley 2020 General Plan.* December 16.

[4] Oakley, City of, 2009. *Oakley Municipal Code.* May.

also established stationary noise threshold standards, shown in Table IV.E-7.

Table IV.E-7: Noise Level Performance Standards for New Projects Affected by or Including Non-Transportation Noise Sources

Noise Level descriptor	Daytime (7:00 a.m. to 10:00 p.m.)	Nighttime (10:00 p.m. to 7:00 a.m.)
Hourly Leq, dBA	55	45

Source: Oakley, City of, 2002. *Oakley 2020 General Plan.* December 16.

The City's requirements for an acoustical analysis are shown in Table IV.E-8. The City's Land Compatibility for Community Noise Environments standards are shown in Table IV.E-9. The City considers exterior noise levels up to 60 dBA CNEL to be normally acceptable for new residential low-density land uses, and up to 65 dBA CNEL for residential multi-family and transient lodging uses. Community noise exposure levels of up to 70 dBA CNEL are considered normally acceptable for new development of land uses including schools, libraries, churches, hospitals, playgrounds, neighborhood parks, commercial, and office buildings.

Table IV.E-8: Requirements for an Acoustical Analysis

An acoustical analysis prepared pursuant to the Noise Element shall:	
A.	Be the financial responsibility of the applicant.
B.	Be prepared by a qualified person experienced in the fields of environmental noise assessment and architectural acoustics.
C.	Include representative noise level measurements with sufficient sampling periods and locations to adequately describe local conditions and the predominant noise sources.
D.	Estimate existing and projected cumulative (20 years) noise levels in terms of L_{dn} or CNEL and/or the standards of Table 1 (see EIR Table IV.E-6, Maximum Allowable Noise Exposure From Transportation Noise Sources), and compare those levels to the adopted policies of the Noise Element.
E.	Recommend appropriate mitigation to achieve compliance with the adopted policies and standards of the Noise Element, giving preference to proper site planning and design over mitigation measures which require the construction of noise barriers or structural modifications to buildings which contain noise-sensitive land uses.
F.	Estimate noise exposure after the prescribed mitigation measures have been implemented.
G.	Describe a post-project assessment program which could be used to evaluate the effectiveness of the proposed mitigation measures.

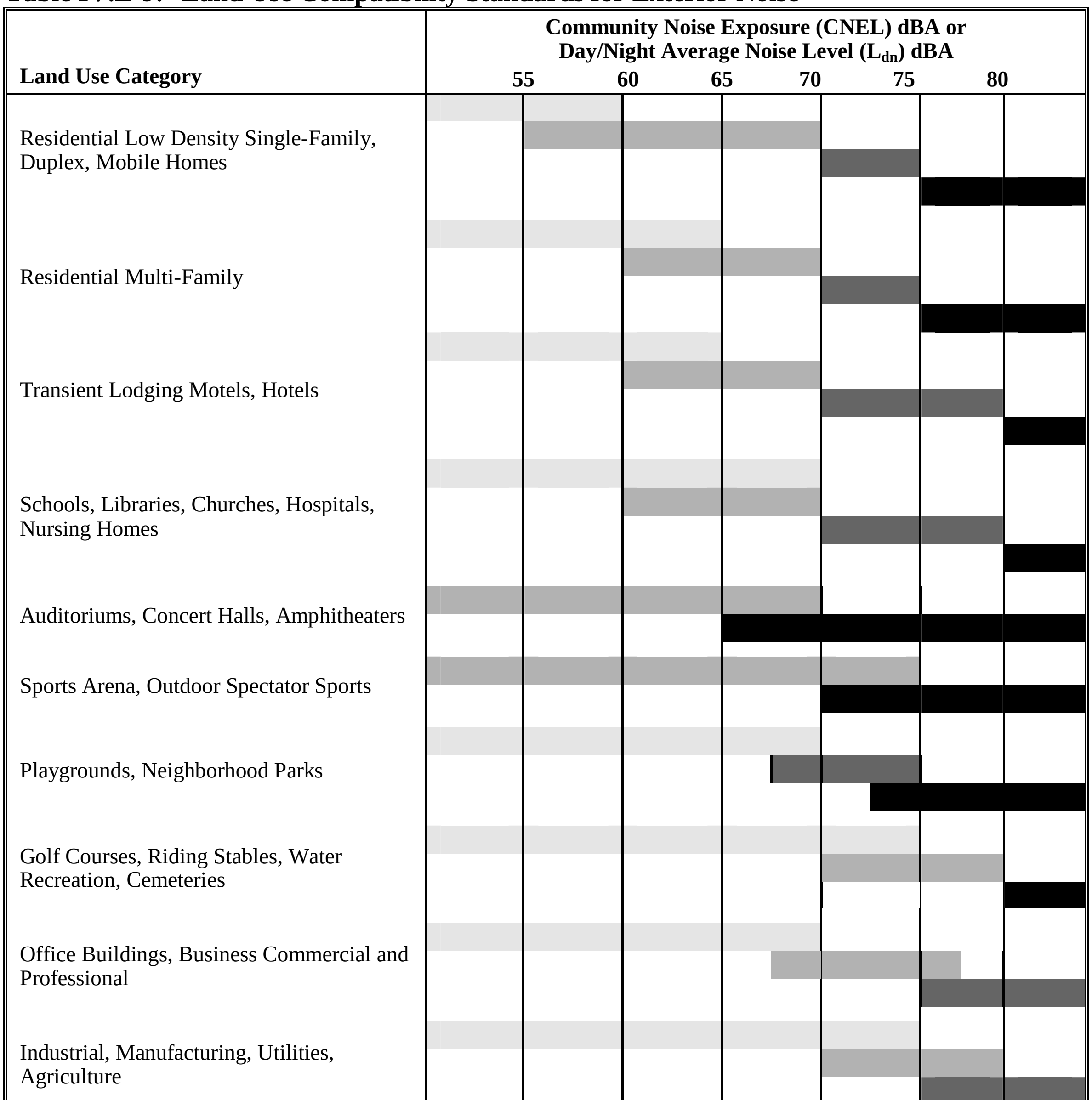
Source: Oakley, City of, 2002. *Oakley 2020 General Plan.* December 16.

According to the Municipal Code section 4.2.208, noise-producing construction related activities within or adjacent to a residential land use must be limited to the hours of 7:30 a.m. to 7:00 p.m. weekdays, and 9:00 a.m. to 7:00 p.m. on weekends and holidays.

d. Overview of the Existing Noise Environment. The project is located in an urban environment. Noise sources that affect the baseline noise levels of the area include the following:

(1) Existing Ambient Noise Levels. Primary noise sources within the DTSP area are traffic and railroad noise. According to noise contours listed in the City's General Plan, existing noise levels for traffic noise within the DTSP area range from 55.1 dBA to 65.5 dBA L_{dn} at 100 feet from the centerline of the outermost travel lane. The existing average sound exposure level (SEL) for train operations along the BNSF Railroad is 97 dBA at 100 feet from the railroad track center line (absent warning horns). The day night average (L_{dn}) for train noise along the BNSF Railroad is approximately 67 dBA L_{dn} at 100 feet from the railroad track center line without warning horns, and 76.5 dBA L_{dn} with warning horns.

Table IV.E-9: Land Use Compatibility Standards for Exterior Noise



NORMALLY ACCEPTABLE
Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

CONDITIONALLY ACCEPTABLE
New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design.

NORMALLY UNACCEPTABLE
New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

CLEARLY UNACCEPTABLE
New construction or development clearly should not be undertaken.

Source: Oakley, City of, 2002. *Oakley 2020 General Plan, Noise Element, Table 9-1.* December 16.

(2) Existing Traffic Noise Levels. Existing traffic noise levels along roadway segments in the DTSP area were calculated using the Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model. This model requires parameters, including traffic volumes, vehicle mix, vehicle speed, and roadway geometry to compute typical equivalent noise levels during daytime, evening, and nighttime hours. Traffic data used in the Noise Prediction Model were obtained from the *Transportation Impact Analysis*[5] prepared for the DTSP (and included as Appendix C of this EIR). The resultant noise levels were weighted and summed over 24-hour periods to determine the Community Noise Equivalent Noise Level (CNEL) values. The CNEL is the 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 5 decibels to sound levels occurring in the evening between 7:00 p.m. and 10:00 p.m. and 10 decibels to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m. Table IV.E-10 lists the traffic noise levels along modeled roadway segments in the DTSP area under existing (2009) conditions. As shown in the table, existing traffic noise in the project vicinity is generally low to moderate with the noisiest roadway segment in the DTSP area being along Main Street from O'Hara Avenue to Rose Avenue with a calculated CNEL of 64.7 dBA at 50 feet from the centerline of the outermost lane. Appendix F contains modeling worksheets for the traffic noise analysis.

Table IV.E-10: Existing (2009) Traffic Noise Levels

Roadway Segment	Average Daily Traffic	Center-line to 70 dBA CNEL (feet)	Center-line to 65 dBA CNEL (feet)	Center-line to 60 dBA CNEL (feet)	CNEL (dBA) 50 feet from Centerline of Outermost Lane
Main Street - Empire Avenue to Miguel Drive	15,500	< 50 [a]	70	144	64.6
Main Street - Miguel Drive to Vintage Parkway	15,700	< 50	71	145	64.6
Main Street - Vintage Parkway to Norcross Lane	15,800	< 50	53	113	64.0
Main Street - Norcross Lane to O'Hara Avenue	16,000	< 50	54	114	64.0
Main Street - O'Hara Avenue to Rose Avenue	12,800	< 50	59	125	64.7
Norcross Lane - South of Main Street	600	< 50	< 50	< 50	48.5
O'Hara Avenue - South of Main Street	3,500	< 50	< 50	< 50	56.2
Main Street Bypass - Main Street to Vintage Parkway	0	NA [b]	NA	NA	NA
Main Street Bypass - Vintage Parkway to Norcross Lane	0	NA	NA	NA	NA
Main Street Bypass - Norcross Lane to Main Street	0	NA	NA	NA	NA

[a] Traffic noise within 50 feet of the roadway centerline requires site-specific analysis.
[b] NA = Not applicable, as roadway does not exist.
Source: LSA Associates Inc., July 2009.

2. Impacts and Mitigation Measures

This section analyzes the potential noise impacts that could result from implementation of the DTSP. The subsection begins with the criteria of significance, which establishes the threshold for determining whether an impact is significant. The latter part of this subsection presents the impacts associated with the proposed project, and recommends mitigation measures as appropriate.

[5] Fehr & Peers, 2009. *City of Oakley Downtown Specific Plan Draft Transportation Impact Analysis Report*. August.

a. Criteria of Significance. Implementation of the DTSP would result in a significant noise impact if it would:

- Expose persons to or generate noise levels in excess of normally acceptable standards established in the General Plan or noise ordinance.
- Expose persons to or generate excessive groundborne vibration or noise.
- Result in a substantial permanent, temporary, or periodic increase in ambient noise levels in the project vicinity above levels existing without the project. For the purposes of this analysis, an increase in noise levels of greater than 3 dBA would be considered significant.

b. Less-Than-Significant Noise Impacts. The following noise sources would produce less-than-significant effects on sensitive receptors in the project area.

(1) Transportation of Construction Workers and Equipment Noise Impacts. Implementation of the proposed project could result in the development of various sites within the DTSP area. The transport of workers and construction equipment and materials to a given project site would incrementally increase noise levels on access roads leading to the site. Because workers and construction equipment would use existing routes, noise from passing trucks (85 dBA L_{max} at 50 feet) would be similar to existing truck-generated noise. For this reason, short-term intermittent noise from trucks would be minor when averaged over a longer time period. In addition, noise associated with on-road vehicles is regulated by federal and State governments and is exempted from local government regulations. Therefore, short-term construction-related noise associated with worker and equipment transport to a proposed project site within the DTSP area would result in a less-than-significant impact on receptors along the access routes leading to a proposed project site.

(2) Aircraft Noise Impacts. The DTSP area is not located within an airport land use plan nor within two miles of a private or public airport or public use airport and, thus, would not expose people residing or working within the project area to excessive noise levels from aircraft related or airport use related sources.

c. Significant Noise Impacts. Noise impacts related to the following sources would result in potentially significant impacts.

(1) Construction Noise Impacts. Implementation of the proposed project could result in noise levels from construction activities that would expose sensitive receptors to excessive noise levels.

<u>Impact NOISE-1</u>: Construction noise related to buildout of the DTSP would generate exterior noise exceeding normally acceptable levels for noise sensitive land uses in the DTSP area. (S)

Noise levels related to construction within the DTSP area would temporarily increase noise levels in the vicinity of individual project sites. Construction is performed in discrete steps, each of which has its own mix of equipment and, consequently, its own noise characteristics. These phases would change the character of the noise generated on an individual project site and, therefore, the noise levels surrounding the site as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction related noise ranges to be categorized by work phase. Table IV.E-11 lists typical construction equipment noise levels recommended for noise impact assessments, based on a distance of 50 feet between the equipment and a noise receptor. Typical noise levels range up to 91 dBA L_{max} at 50 feet during the noisiest construction phases. The site preparation phase, which includes excavation and grading of the site, tends to generate the highest noise levels, because the noisiest construction equipment is earthmoving equipment. Earthmoving equipment includes excavating machinery such as backhoes, bulldozers, draglines, and front loaders. Earthmoving and compacting equipment includes compactors, scrapers, and graders. Typical operating cycles for these types of construction equipment may involve one or two minutes of full-power operation followed by three or four minutes at lower power settings.

Table IV.E-11: Typical Construction Equipment Maximum Noise Levels, L_{max}

Type of Equipment	Range of Maximum Sound Levels (dBA at 50 feet)	Suggested Maximum Sound Levels for Analysis (dBA at 50 feet)
Pile Drivers	81 to 96	93
Rock Drills	83 to 99	96
Jackhammers	75 to 85	82
Pneumatic Tools	78 to 88	85
Pumps	74 to 84	80
Scrapers	83 to 91	87
Haul Trucks	83 to 94	88
Cranes	79 to 86	82
Portable Generators	71 to 87	80
Rollers	75 to 82	80
Dozers	77 to 90	85
Tractors	77 to 82	80
Front-End Loaders	77 to 90	86
Hydraulic Backhoe	81 to 90	86
Hydraulic Excavators	81 to 90	86
Graders	79 to 89	86
Air Compressors	76 to 89	86
Trucks	81 to 87	86

Source: Bolt, Beranek & Newman, 1987. *Noise Control for Buildings and Manufacturing Plants.*

Construction within the DTSP area is expected to require the use of earthmovers such as bulldozers and scrapers, loaders and graders, water trucks, and dump trucks. Pile driving is not assumed during construction activity and is not addressed in this analysis. As shown in Table IV.E-11, the typical maximum noise level generated by backhoes on the proposed project site is assumed to be 86 dBA L_{max} at 50 feet from the operating equipment. The maximum noise level generated by bulldozers is approximately 85 dBA L_{max} at 50 feet. The maximum noise level generated by water and other trucks is approximately 86 dBA L_{max} at 50 feet from these vehicles. Each doubling of the sound sources with equal strength would increase the noise level by 3 dBA. Assuming each piece of construction equipment operates at some distance apart from the other equipment, the worst-case combined noise level during this phase of construction would be 91 dBA L_{max} at a distance of 50 feet from an active construction area.

Construction-related noise impacts would occur throughout buildout of projects within the DTSP area. Construction-related noise would affect different receptors for varying short-term amounts of time as different stages and sections within the DTSP area are completed. Construction-related noise impacts would be less-than-significant if each of the noise-reducing measures, described below, are implemented.

Mitigation Measure NOISE-1: All construction projects within the DTSP area shall comply with the following construction noise reduction measures:

- During all project site excavation and on-site grading, the project contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers consistent with manufacturers' standards. All heavy construction equipment used on project sites within the DTSP area shall be maintained in good operating condition, with all internal combustion, engine-driven equipment equipped with intake and exhaust mufflers that are in good condition. "Quiet" models of air compressors and other stationary noise sources shall be utilized where such technology exists.

- The construction contractors shall place all stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest individual project sites. The construction contractors shall also locate equipment staging in areas as far away as possible from noise-sensitive receptors nearest individual project sites within the DTSP area during all project construction.
- The construction contractors shall post signs prohibiting unnecessary idling of internal combustion engines. The contractors shall further designate a “noise disturbance coordinator” who would be responsible for responding to any local complaints about construction noise. The disturbance coordinator would determine the cause of the noise complaints (e.g. beginning work too early, bad muffler) and institute reasonable measures warranted to correct the problem. A telephone number for the disturbance coordinator shall be conspicuously posted at all construction sites within the DTSP area.
- Consistent with the City's noise ordinance of the Municipal Code, all noise-producing construction related activities shall be limited to the hours of 7:30 a.m. to 7:00 p.m. weekdays and 9:00 a.m. to 7:00 p.m. on weekends and holidays. (LTS)

(2) Traffic and Railroad Noise Impacts. Implementation of the proposed project could result in noise levels from project-related traffic and railroad noise sources that would expose sensitive receptors to excessive noise levels or in significant increases over noise levels existing without the project.

<u>Impact NOISE-2</u>: Local traffic and railroad operations would generate long-term exterior noise exceeding normally acceptable levels for proposed sensitive land use development in the DTSP area. (S)

The FHWA highway traffic noise prediction model (FHWA RD-77-108) was used to evaluate traffic-related noise conditions in the vicinity of the DTSP site. The resultant noise levels were weighed and summed over a 24-hour period in order to determine the CNEL values. The existing and cumulative (year 2030) traffic volumes for roadway segments in the project vicinity were used in the traffic noise impact analysis. Tables IV.E-12 and IV.E-13 show the predicted cumulative (2030) traffic noise levels without and with the project, respectively, for modeled roadway segments in the DTSP area.

According to the significance criteria of the City of Oakley, a significant impact would occur if the project would permanently increase ambient exterior noise levels by more than 3 dBA over existing levels without the project. No roadway segment would experience an increase in traffic noise levels with implementation of the project of 3 dBA or greater over levels without the project. The segments of Norcross Lane and O’Hara Avenue would experience the highest increase in traffic noise levels of up to 2.8 dBA over cumulative (2030) conditions without the project. Therefore, implementation of the proposed project would result in a less-than-significant increase in traffic noise levels.

A significant impact would, however, occur if the project resulted in noise levels in excess of normally acceptable standards established in the General Plan or noise ordinance. The cumulative traffic noise levels with the project, shown in Table IV.E-13, would range from 53.5 dBA to 69.4 dBA CNEL at 50 feet from the centerline of the outermost travel lane. Noise levels above 65 dBA CNEL would exceed the “normally acceptable” threshold for new multi-family residential land use development (see EIR Table IV.E-9, Land Use Compatibility Standards for Exterior Noise), as well as the maximum allowable noise exposure threshold

Table IV.E-12: Cumulative (2030) Traffic Noise Levels Without the Project

Roadway Segment	Average Daily Traffic	Center-line to 70 dBA CNEL (feet)	Center-line to 65 dBA CNEL (feet)	Center-line to 60 dBA CNEL (feet)
Main Street - Empire Avenue to Miguel Drive	28,100	< 50 [a]	101	212
Main Street - Miguel Drive to Vintage Parkway	28,900	< 50	102	216
Main Street - Vintage Parkway to Norcross Lane	28,500	< 50	78	167
Main Street - Norcross Lane to O'Hara Avenue	28,700	< 50	78	167
Main Street - O'Hara Avenue to Rose Avenue	26,300	< 50	94	202
Norcross Lane - South of Main Street	1,000	< 50	< 50	< 50
O'Hara Avenue - South of Main Street	4,000	< 50	< 50	< 50
Main Street Bypass - Main Street to Vintage Parkway	0	NA [b]	NA	NA
Main Street Bypass - Vintage Parkway to Norcross Lane	0	NA	NA	NA
Main Street Bypass - Norcross Lane to Main Street	0	NA	NA	NA

[a] Traffic noise within 50 feet of the roadway centerline requires site-specific analysis.
[b] NA = Not applicable, as roadway would not exist under without project conditions.
Source: LSA Associates Inc., July 2009.

Table IV.E-13: Cumulative (2030) Traffic Noise Levels With the Project

Roadway Segment	Average Daily Traffic	Center-line to 70 dBA CNEL (feet)	Center-line to 65 dBA CNEL (feet)	Center-line to 60 dBA CNEL (feet)	CNEL (dBA) 50 feet from Centerline of Outermost Lane	Increase from No Project Conditions
Main Street - Empire Avenue to Miguel Drive	38,700	61	123	262	68.6	1.4
Main Street - Miguel Drive to Vintage Parkway	8,700	< 50	< 50	99	62.1	-5.2
Main Street - Vintage Parkway to Norcross Lane	9,700	< 50	< 50	82	61.9	-4.7
Main Street - Norcross Lane to O'Hara Avenue	9,700	< 50	< 50	82	61.9	-4.7
Main Street - O'Hara Avenue to Rose Avenue	37,800	57	120	257	69.4	1.6
Norcross Lane - South of Main Street	1,900	< 50	< 50	< 50	53.5	2.8
O'Hara Avenue - South of Main Street	8,600	< 50	< 50	57	59.5	2.8
Main Street Bypass - Main Street to Vintage Parkway	30,800	< 50	107	225	67.6	NA [b]
Main Street Bypass - Vintage Parkway to Norcross Lane	31,900	< 50	109	230	67.7	NA
Main Street Bypass - Norcross Lane to Main Street	31,000	< 50	107	226	67.6	NA

[a] Traffic noise within 50 feet of the roadway centerline requires site-specific analysis.
[b] NA = Not applicable, as roadway would not exist under without project conditions.
Source: LSA Associates Inc., July 2009.

from transportation noise sources (see EIR Table IV.E-6, Maximum Allowable Noise Exposure From Transportation Noise Sources). Therefore, a noise analysis specifying necessary mitigation would be required for any proposed new noise sensitive land use development within the 65 dBA CNEL roadway noise contours. In addition to the modeled project traffic noise levels, the proposed realignment of Main Street could also affect existing or future sensitive receptors resulting in an exceedance of the City's transportation noise standards that would require mitigation. The DTSP proposed Main Street Realignment and Main Street Improvements that would connect to Highway 4 may require Caltrans approval, including the preparation of a separate noise study report, in the event that they are constructed prior to the relinquishment of Caltrans ownership or if the improvements are implemented using federal or State funding sources, as applicable.

In addition, railroad noise sources would potentially cause a significant impact for future residences located in the DTSP. Existing maximum noise levels resulting from railroad related noise sources can range from 67 dBA to 76.5 dBA L_{dn} at 100 feet from the railroad track center line. This is above the normally acceptable standards for both low and high-density residential land uses. According to the City's Noise Element, a noise analysis specifying necessary mitigation would be needed for any proposed new residential or transient lodging land use development within the 65 dBA noise contour line (within approximately 135 feet of the railroad track centerline).

Implementation of the following two-part mitigation measure would sufficiently reduce long-term transportation-related noise to comply with the City's standards and would mitigate the transportation noise impacts within the DTSP area to a less-than-significant level. Implementation of Mitigation Measure NOISE-2a would be sufficient to reduce the potential impacts of railroad noise to a less-than-significant level.

Mitigation Measure NOISE-2a: All development projects proposed under the DTSP that would be exposed to noise levels in excess of the City's standards for the maximum allowable noise exposure levels from transportation sources, shown in Tables 9-3 and 9-1 of the General Plan (Tables IV.E-6 and IV-E-7 of the EIR), shall demonstrate compliance with General Plan Policies 9.2.1 and 9.2.2, as follows:

- *General Plan Policy 9.2.1:* New development of noise-sensitive land uses shall not be permitted in areas exposed to existing or projected levels of noise from transportation noise sources which exceed the levels specified in Table 9-3 (see EIR Table IV.E-6, Maximum Allowable Noise Exposure From Transportation Noise Sources), unless the project design includes effective mitigation measures to reduce exterior noise and noise levels in interior spaces to the levels specified in Table 9-3 (see EIR Table IV.E-6, Maximum Allowable Noise Exposure From Transportation Noise Sources).
- *General Plan Policy 9.2.2:* Where noise-sensitive land uses are proposed in areas exposed to existing or projected exterior noise levels exceeding the levels specified in Table 9-3 (see EIR Table IV.E-6, Maximum Allowable Noise Exposure From Transportation Noise Sources) or the performance standards of Table 9-1 (see EIR Table IV.E-7, Noise Level Performance Standards for New Projects Affected by or Including Non-Transportation Noise Sources), an acoustical analysis shall be required as part of the environmental review process so that noise mitigation may be included in the project design.

Demonstration of compliance with the above General Plan policies shall be submitted to the Community Development Director prior to issuance of building permits. Mitigation measures may include, but are not limited to, installation of air conditioning systems to allow windows to remain closed for extended periods of time, upgraded window or wall assemblies to reduce exterior to interior noise transmission, or setback requirements to reduce transportation related noise impacts on noise sensitive land uses.

Mitigation Measure NOISE-2b: All roadway projects proposed under the DTSP that could lead to increased noise levels shall demonstrate compliance with General Plan Policy 9.1.5, as follows:

- *General Plan Policy 9.1.5:* Noise created by new transportation noise sources shall be mitigated so as not to exceed the levels specified in Table 9-3 (see EIR Table IV.E-6, Maximum Allowable Noise Exposure From Transportation Noise Sources) at outdoor activity areas or interior spaces of existing noise-sensitive land uses.

Demonstration of compliance with General Plan Policy 9.1.5 shall be submitted to the Community Development Director prior to project approval. Mitigation measures may include, but are not limited to, traffic calming measures, sound walls, or setback requirements to reduce transportation related traffic noise impacts on noise sensitive land uses. (LTS)

(3) Stationary Noise Impacts. Implementation of the proposed project could result in the following noise impacts from stationary noise sources.

Impact NOISE-3: Buildout of the DTSP could include stationary noise sources that would generate long-term exterior noise exceeding normally acceptable levels for noise sensitive land uses in the DTSP area. (S)

Existing stationary (i.e., non-transportation) noise sources in the DTSP area are primarily commercial operational noise sources. Such land uses include stationary noise sources such as parking lot activity noises, HVAC systems compressors and fans, and loading and unloading operations of delivery trucks at restaurants and commercial land uses.

Future development projects may include stationary noise sources that could impact existing noise sensitive receptors within the DTSP. Similarly, future development may include noise sensitive land uses that would be located near existing stationary noise sources. Implementation of the following mitigation would reduce these potential stationary noise impacts to a less-than-significant level.

Mitigation Measure NOISE-3: All projects proposed under the DTSP shall demonstrate compliance with General Plan Policies 9.1.2, 9.1.3, and 9.1.4, as follows:

- *General Plan Policy 9.1.2:* New development of noise-sensitive uses shall not be allowed where the noise level due to non-transportation noise sources will exceed the noise level standards of Table 9-1 (see EIR Table IV.E-7, Noise Level Performance Standards for New Projects Affected by or Including Non-Transportation Noise Sources) as measured immediately within the property line or within a designated space outdoor activity area (location is at the discretion of the Community Development Director) of the new development, unless effective mitigation measures have been incorporated into the development design to achieve the standards specified in Table 9-1 (see EIR Table IV.E-7, Noise Level Performance Standards for New Projects Affected by or Including Non-Transportation Noise Sources).
- *General Plan Policy 9.1.3:* Noise created by new proposed non-transportation noise sources shall be mitigated so as not to exceed the noise level standards of Table 9-1 (see EIR Table IV.E-7, Noise Level Performance Standards for New Projects Affected by or Including Non-

Transportation Noise Sources) as measured immediately within the property line of lands designated for noise-sensitive uses.

- *General Plan* Policy 9.1.4: Where non-residential land uses are likely to produce noise levels exceeding the performance standards of Table 9-1 (see EIR Table IV.E-7, Noise Level Performance Standards for New Projects Affected by or Including Non-Transportation Noise Sources) at existing or planned noise-sensitive uses, an acoustical analysis shall be required as part of the environmental review process so that noise mitigation may be included in the project design. The requirements for the contents of an acoustical analysis are given in Table 9-2 (see EIR Table IV.E-7, Noise Level Performance Standards for New Projects Affected by or Including Non-Transportation Noise Sources).

Demonstration of compliance shall be submitted to the Community Development Director prior to issuance of building permits. Mitigation measures may include, but are not limited to, installation of air conditioning systems to allow windows to remain closed for extended periods of time, upgraded window or wall assemblies to reduce exterior to interior noise transmission, or setback requirements to reduce stationary noise impacts on noise sensitive land uses. (LTS)

(4) Groundborne Vibration and Noise Impacts. Railroad-related groundborne vibration from the BNSF tracks in the DTSP area could temporarily expose future residents and employees in the vicinity of the DTSP area to excessive ground borne vibration or ground borne noise levels.

Impact NOISE-4: Development related to buildout of the DTSP could expose sensitive receptors to railroad-related groundborne vibration levels exceeding normally acceptable levels for noise sensitive land uses. (S)

According to the *Transit Noise and Vibration Impact Assessment* of the Federal Transit Administration (FTA) it is not uncommon for freight trains to be the source of intrusive groundborne vibration, with the main source being locomotives and rail cars with wheel flats. Use of the existing railroad adjacent to the DTSP area could generate ground borne vibration or ground borne noise levels on noise sensitive land uses that would be located within 200 feet of the railroad right-of-way. The FTA's impact criteria for groundborne vibration and noise levels for residential land uses are 72 vibration decibels (VdB) and 35 dBA respectively for frequent events. To ensure future development adjacent to the railroad would not exceed FTA's vibration criteria and to reduce impacts to a less-than-significant level, the following mitigation measure shall be implemented:

Mitigation Measure NOISE-4: All projects proposed under the DTSP that would be located within 200 feet of the railroad tracks centerline shall submit an acoustical study detailing ground borne vibration and noise level impacts and the measures that would be incorporated into the project to reduce the identified impacts to meet the Federal Transit Administration's impact criteria standards. Such analysis shall be submitted for review and approval to the Community Development Director prior to issuance of building permits. (LTS)

IV. SETTING, IMPACTS AND MITIGATION MEASURES

This chapter contains an analysis of each topic that has been identified through preliminary environmental evaluation of the DTSP, and, as such, constitutes the major portion of this EIR. Sections A through E of this chapter describe the environmental setting of the proposed project as it relates to each specific environmental topic. The impacts resulting from implementation of the DTSP, and mitigation measures that would reduce impacts of the project, if necessary, are also presented in each of the sections.

DETERMINATION OF SIGNIFICANCE

Under CEQA, a significant effect is defined as a substantial, or potentially substantial, adverse change in the environment.[1] The *CEQA Guidelines* direct that this determination be based on scientific and factual data. Each impact evaluation in this chapter is prefaced by criteria of significance, which are the thresholds for determining whether an impact is significant.

ISSUES ADDRESSED IN THE DRAFT EIR

The following environmental issues are addressed in this chapter:

A. Cultural Resources
B. Transportation, Circulation and Parking
C. Air Quality
D. Global Climate Change
E. Noise

Preliminary analysis contained in the Initial Study (included in Appendix B) determined that implementation of the DTSP would result in either no impacts or less-than-significant impacts to aesthetics, agricultural resources, biological resources, geology and soils, hazards and hazardous materials, hydrology and water quality, land use and planning policy, mineral resources, population and housing, public services, recreation, and utilities and service systems. Consequently, these issues are not examined in this chapter of the EIR.

FORMAT OF ISSUE SECTIONS

Each environmental issue section has two main subsections: 1) Setting, and 2) Impacts and Mitigation Measures. Any identified significant impacts are numbered and shown in bold type, and the corresponding mitigation measures are numbered and indented. Significant impacts and mitigation measures are numbered consecutively within each topic and begin with a shorthand abbreviation for

[1] Public Resources Code Section 21068.

the impact section (e.g., CULT for Cultural Resources). The following abbreviations are used for individual topics:

CULT:	Cultural Resources
TRANS:	Transportation, Circulation and Parking
AIR:	Air Quality
GCC:	Global Climate Change
NOISE:	Noise

Impacts are also categorized by type of impacts as follows: Less-than-Significant (LTS); Significant (S); and Significant and Unavoidable (SU). These notations are provided following each impact and each mitigation measure to identify their significance before and after mitigation.

V. ALTERNATIVES

The *CEQA Guidelines* require the analysis of a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the project's basic objectives and avoid or substantially lessen any of the significant effects of the project. The range of alternatives required in an EIR is governed by a "rule of reason" that requires the EIR to set forth only those alternatives necessary to permit a reasoned choice.[1] CEQA states that an EIR should not consider alternatives "whose effect cannot be ascertained and whose implementation is remote and speculative."

The various components of the DTSP are described and analyzed in the previous chapters, with an emphasis on significant impacts resulting from the project and recommended mitigation measures to avoid these impacts. The following discussion is intended to inform the public and decision-makers of the relative impacts of four potentially feasible alternatives to the Draft Specific Plan. A discussion of the environmentally superior alternative is also provided.

The goals and objectives developed for the DTSP are an important part of the context for evaluating alternatives, and are discussed in greater detail in Chapter III, Project Description. The objectives are restated here for reference:

- Implement Main Street improvement projects including installation of new curbs, sidewalks, street trees, streetlights, and other basic amenities to enhance Downtown's image and its ability to attract new businesses.
- Promote property renovation and redevelopment through a Façade Improvement Program that injects life into existing properties.
- Obtain funding and implement the Main Street Realignment.
- Focus pedestrian oriented development Downtown through revitalizing existing uses and encouraging higher density residential development and supporting commercial services.
- Concentrate storefront development within the Downtown Core to create a pedestrian-oriented commercial district, with contiguous storefront buildings concentrated within a walkable area.

The three alternatives to the proposed project discussed in this chapter include the following:

- The **No Project alternative** assumes that no future development activities or private investment would occur within the boundaries of the DTSP area, and that existing conditions would continue.
- The **Reduced Density alternative** considers the impacts of development that would result from a 20 percent reduction in commercial and residential development proposed by the DTSP. Up to 288,000 square feet of new commercial uses and 240 residential units would be constructed under this alternative.

[1] *CEQA Guidelines*, 2009. Section 15126.6.

- The **No Main Street Realignment alternative** considers the impacts of the proposed DTSP without implementation of the Main Street Realignment. It is assumed that Main Street would be widened along its current alignment to accommodate existing and future through traffic.

Following is a discussion of each alternative, including an analysis of anticipated environmental impacts. This analysis compares the anticipated impacts of each alternative to the impacts associated with the proposed project; the discussion includes a determination as to whether or not each alternative would reduce, eliminate, or create new significant impacts.

A. NO PROJECT ALTERNATIVE

1. Principal Characteristics

Under the No Project alternative the project would not proceed, and the DTSP area would remain in its existing state as of mid-2009. This alternative is contrary to the existing General Plan as well as zoning for the DTSP area. No new construction or expansion of housing or retail/commercial development would occur under this alternative. Capital improvement projects, particularly the Main Street Realignment, as well as improvements to the Main Street streetscape and building frontage, east Main Street widening and streetscape, Downtown side streets, building facades, and infrastructure projects proposed as part of the DTSP would not be implemented.

This alternative assumes that no new development would occur within the Plan Area during the short term. However, the existing General Plan designations and zoning would remain and would continue to govern development and/or redevelopment of vacant and underutilized parcels within the Plan Area over the long term.

2. Analysis of the No Project Alternative

Under this alternative, each of the significant impacts and significant unavoidable impacts to historic architectural resources and to the Oakley Old Town Historic District that would result from DTSP development would be avoided. The absence of growth in the area would not increase congestion or noise from traffic and construction, and would not contribute to increased greenhouse gas emissions and air pollution in the region, as described in greater detail below.

However, the No Project alternative would fundamentally fail to meet the goals and objectives of the proposed project and would not implement the General Plan’s vision for Downtown revitalization.

a. Cultural Resources. The No Project alternative, which would not involve any ground-disturbing activities, would avoid the impacts of the project on archaeological resources (including human remains). In addition, none of the historic structures within the Old Town Oakley Historic District would be demolished or relocated as a result of the DTSP proposed Main Street Realignment or development/redevelopment of Opportunity Sites, avoiding the significant unavoidable project impacts to the historic architectural resources and to the District as a whole. Façade improvements would not be implemented, and the qualities that justify and convey the significance of historic structures would not be altered. However, existing historic structures within the area would continue to deteriorate without implementation of the Façade Improvement Program or the potential for reinvestment that would be encouraged by the Plan’s adoption.

b. Transportation, Circulation and Parking. In terms of vehicle traffic, the No Project alternative would result in fewer substantial impacts compared to the project. Many of the congestion-related impacts of the proposed project would be reduced, including impacts to the intersections of Main Street/Empire Avenue and West Cypress Road/O'Hara Avenue; however, operation at the West Cypress Road/O'Hara Avenue intersection would remain deficient in the cumulative condition. The No Project alternative would also avoid the potentially significant unavoidable impact that would occur at the Main Street/Main Street Bypass/O'Hara Avenue Roundabout under Option #2 of the east end of the Main Street Realignment. However, the alternative would not result in the circulation and parking improvements envisioned in the DTSP, specifically the rerouting of through auto and truck traffic away from Main Street. Therefore, implementation of the DTSP would be superior to the No Project alternative in terms of transportation impacts.

c. Air Quality. Implementation of the No Project alternative would not result in construction activity within the DTSP area and would not result in a substantial increase in vehicular trips in the City. Similar to the proposed project, the No Project alternative would not substantially increase odor concentrations, carbon monoxide (CO) concentrations, or regional emissions that could exceed Bay Area Air Quality Management District (BAAQMD) standards, nor would it expose sensitive receptors to toxic emissions. The No Project alternative would not generate construction-period emissions of particulate matter and other pollutants, and would not require mitigation to reduce this impact to a less-than-significant level.

d. Global Climate Change. The No Project alternative would not increase vehicle emissions, construction emissions, or operational emissions within the DTSP area. However, existing structures that would not be redeveloped under the No Project alternative would continue to operate in less energy efficient ways than new or redeveloped buildings would. Existing structures within the DTSP area would continue to generate greenhouse gas emissions that would contribute to global climate change.

e. Noise. Construction activity would not take place as part of the No Project alternative. Therefore, the No Project alternative would not expose surrounding land uses to significant noise levels. This alternative would not increase local traffic and would not expose sensitive receptors to increased noise levels. No significant noise impacts would result from implementation of the No Project alternative.

B. REDUCED DENSITY ALTERNATIVE

1. Principal Characteristics

The Reduced Density alternative would allow development and redevelopment of the Plan Area with the same mix of uses as the proposed DTSP, but would reduce the density of commercial and residential development by 20 percent. Therefore, up to 288,000 square feet of new commercial uses and 240 residential units would be constructed under this alternative. New structures would likely be no more than 4-stories tall within the Downtown Core and Support areas. All other DTSP proposed improvements would be implemented.

2. Analysis of Reduced Density Alternative

As described in greater detail below, the Reduced Density alternative would not avoid any of the significant or significant unavoidable impacts identified for the proposed DTSP. The Reduced Density alternative would lessen the impacts of the project that would result from increased traffic congestion, traffic-generated noise, construction-period noise and air pollution, greenhouse gas emissions, and energy consumption. Like the proposed project, this alternative would result in the demolition of six historic architectural resources to allow development of the Main Street Realignment, resulting in a significant unavoidable impact to historic architectural resources and to the Oakley Old Town District as a whole. Similar to the proposed project, the development of Opportunity Sites could also result in the demolition or substantial alteration of historical resources and/or introduction of new development that would adversely alter the setting of historical resources, resulting in a significant unavoidable impact to those resources. This alternative would also result in a significant unavoidable impact if Option 2 for the Main Street Realignment were to be implemented. The Reduced Density alternative would meet or achieve all of the project objectives, although to a lesser degree than the proposed project.

a. Cultural Resources. Under the Reduced Density alternative, the Main Street Realignment component of the DTSP would still require demolition of six historic architectural resources, resulting in a significant unavoidable impact to those resources and to the Oakley Old Town Historic District as a whole. Similar to the proposed project, the development of Opportunity Sites could also result in the demolition or substantial alteration of historical resources and/or introduction of new development that would adversely alter the setting of historical resources, resulting in a significant unavoidable impact to those resources. In addition, impacts to archaeological resources and human remains and impacts associated with façade improvements would be similar to the proposed project and implementation of the mitigation measures recommended in Section IV.A, Cultural Resources of this EIR would be required to reduce these impacts to a less-than-significant level under this alternative.

b. Transportation, Circulation and Parking. Under the Reduced Density alternative, impacts to the transportation system would be the same as the proposed project, although to a lesser extent. A 20 percent reduction of commercial and residential development in the Plan Area would not be substantial enough to eliminate the significant impacts to the Main Street/Empire Avenue and West Cypress Road/O'Hara Avenue intersections. Similar to the proposed project, mitigation measures would be required to reduce impacts to these intersections to a less-than-significant level. Also similar to the proposed project, individual projects developed under this alternative would require final site plan review and approval to ensure that potential impacts associated with hazardous design features, inadequate emergency access, and conflicts with adopted transportation policies, plans, and programs would be reduced to a less-than-significant level.

In addition, under this alternative, the Main Street/Main Street Bypass/O'Hara Avenue roundabout (Option 2 considered as part of the Main Street Realignment component of the DTSP) could still be considered for implementation, which could result in a significant unavoidable impact, similar to the proposed project.

c. Air Quality. The Reduced Density alternative would result in construction emissions similar to but slightly less than what would be emitted by the proposed project, and mitigation measures to reduce the release of dust and diesel exhaust would still be required. Like the proposed project, the alternative would not conflict with the Clean Air Plan. Also like the proposed project, this alternative would not generate volumes of vehicle-related pollutants that are regionally significant, would not result in carbon monoxide hot spots at local congested intersections, and would not be a source of toxic air contaminants.

d. Global Climate Change. The Reduced Density alternative would result in slightly reduced levels of greenhouse gas emissions compared to the DTSP, since the level of development would be less than that proposed by the DTSP. However, this alternative would still conflict with the goals of AB 32 and increase the consumption of energy resources; therefore, the mitigation measures recommended in Section IV.D, Global Climate Change of this EIR would be required to reduce these impacts to a less-than-significant level.

e. Noise. Construction activities that would occur as part of the Reduced Density alternative would be incrementally reduced compared to the proposed project. Although operation and buildout noise conditions under this alternative would be slightly less than what would occur under the DTSP and therefore long-term exterior noise levels that exceed acceptable levels for sensitive land uses would also be slightly less, the mitigation measures recommended in Section IV.E, Noise of this EIR would still be required to reduce potential impacts to a less-than-significant level.

C. NO MAIN STREET REALIGNMENT ALTERNATIVE

1. Principal Characteristics

Under the No Main Street Realignment alternative, a major component of the DTSP – the northerly realignment of a ½-mile segment of Main Street – would not occur. Commuter and through traffic would continue along the current Main Street alignment, which would need to be widened (rather than narrowed as proposed by the DTSP) to accommodate existing and future through traffic generated by DTSP development. Main Street would be widened to four lanes, requiring between 38 and 63 feet of new right of way, for a total of 126 feet. Residential and commercial frontage, including approximately 10 commercial and residential structures, some of which may be considered historic resources under CEQA, would be demolished or significantly altered to accommodate the widened roadway.

Similar to the DTSP, approximately 360,000 square feet of commercial development and up to 300 dwelling units would be accommodated within the Plan Area. Some residential and commercial square footage could be transferred from the Main Street frontage to the area considered by the DTSP for the Main Street Realignment. All other aspects of DTSP proposed development and planned improvements would occur under this alternative, to the extent feasible.

2. Analysis of No Main Street Realignment Alternative

Under this alternative, the significant unavoidable impacts to historic architectural resources and to the Oakley Old Town Historic District that would result from the Main Street Realignment component of the DTSP would not be avoided and potential impacts to these resources could even be greater. In addition, transportation impacts would be similar to or greater than the proposed project. Noise from traffic and construction, increased greenhouse gas emissions, energy use, and dust and diesel emissions that contribute to regional air pollution would be similar to the proposed project and would require implementation of similar mitigation measures to reduce these impacts to a less-than-significant level. A detailed discussion of the impacts associated with this alternative, compared to the impacts of the proposed DTSP, is provided below.

The No Main Street Realignment alternative fails to meet a major objective of the proposed project – construction of the Main Street Realignment. In addition, implementation of this alternative would obstruct the ability of the City to meet the main objective of the project, which is to revitalize the Downtown. With the widening of Main Street to a four-lane roadway and the demolition or alteration of up to 10 structures along Main Street, none of the project objectives would be realized. The Façade Improvement Program would not be fully implemented, as many of the structures identified for improvement would be demolished to accommodate the widened roadway. Pedestrian-oriented and storefront improvements proposed for the Plan Area, specifically those identified for Main Street, could still generally be implemented as part of the roadway widening but would be ineffective in achieving the goal of creating a vibrant Downtown commercial district that is accessible and attractive to pedestrians.

a. Cultural Resources. Under the No Main Street Realignment alternative, the six historic architectural resources identified for demolition under the DTSP would not be demolished to allow construction of the Main Street Realignment. However, since Main Street would then be widened in place to accommodate future traffic flows, up to 10 commercial and residential structures within the center of the Downtown, some of which may qualify as historic resources under CEQA, would likely be demolished or altered to accommodate the right of way required for the two new travel lanes. In addition, the six historic structures along the DTSP proposed Main Street Realignment may then be identified as Opportunity Sites for redevelopment, in order to accommodate DTSP proposed growth in the area, and may not be preserved. Therefore, the significant unavoidable impact to these six resources, as well as to the Oakley Old Town Historic District as a whole, that would result from implementation of the DTSP would not likely be avoided, even if the Main Street Realignment component is removed from the plan. In addition, impacts to archaeological resources and human remains and impacts associated with façade improvements would be similar to the proposed project and implementation of the mitigation measures recommended in Section IV.A, Cultural Resources of this EIR would be required to reduce these impacts to a less-than-significant level under this alternative.

b. Transportation, Circulation and Parking. To accommodate future traffic generated by development that would occur under the No Main Street Realignment alternative, Main Street would be widened to four lanes in its current location. Although this would result in different traffic patterns and trip distribution within the Plan Area, development under this alternative would result in similar or even greater intersection level of service impacts as the proposed project. While widening of Main Street could alleviate some of these conditions within the immediate vicinity, it is possible that existing roadways that would connect to the widened Main Street (such as Vintage Parkway, Norcross Lane, O'Hara Avenue, and Second Street) and other parallel roadways such Cypress Road and Laurel Road could experience increased congestion as vehicles would divert to them. In addition, because the Main Street/Empire Avenue and West Cypress Road/O'Hara Avenue intersections are outside of the Plan Area, and because the former intersection would already operate at an unacceptable level of service in the cumulative condition under the No Project scenario, these impacts would also likely result with implementation of the No Main Street Realignment alternative. Similar to the proposed project, is it anticipated that any impacts to intersections could be reduced to less-than-significant levels with implementation of mitigation measures specific to each intersection, some of which could be similar to those recommended in Section IV.B, Transportation, Circulation and Parking of this EIR (i.e., signalization, addition of turn-lanes). Also similar to the proposed project, individual projects developed under this alternative would require final site plan review and approval to ensure that potential impacts associated with hazardous design features, inadequate emergency access, and conflicts with adopted transportation policies, plans, and programs would be reduced to a less-than-significant level.

In addition, under this alternative, the Main Street/Main Street Bypass/O'Hara Avenue roundabout (Option 2 considered as part of the Main Street Realignment component of the DTSP) would not be considered for the east end realignment of Main Street, avoiding this possibly significant unavoidable project impact.

c. Air Quality. The No Main Street Realignment alternative would result in construction emissions similar to those generated by the proposed project, and mitigation measures to reduce the release of dust and diesel exhaust would still be required. Like the proposed project, the alternative would not conflict with the Clean Air Plan. Also like the proposed project, this alternative would not generate volumes of vehicle-related pollutants that are regionally significant, would not result in carbon monoxide hot spots at local congested intersections, and would not be a source of toxic air contaminants.

d. Global Climate Change. This alternative would not likely result in reduced levels of greenhouse gas emissions compared to the DTSP, since the level of development would be the same as that proposed by the DTSP. This alternative would still conflict with the goals of AB 32 and increase the consumption of energy resources; therefore, the mitigation measures recommended in Section IV.D, Global Climate Change of this EIR would be required to reduce these impacts to a less-than-significant level.

e. Noise. Construction activities that would occur as part of the No Main Street Realignment alternative would be similar to the proposed project. In addition, operation and buildout of development under this alternative would be similar to the DTSP and would therefore result in similar long-term exterior noise levels that exceed acceptable levels for sensitive land uses. The mitigation measures recommended in Section IV.E, Noise of this EIR would be required to reduce potential impacts to a less-than-significant level.

D. OTHER ALTERNATIVES CONSIDERED

The following discussion includes a description of alternatives considered but ultimately rejected for evaluation as part of this EIR.

1. New Location Alternative

A new location alternative for projected Downtown development was considered but not further evaluated because it would not meet any of the objectives of the DTSP. The main objective of the DTSP is to revitalize the Downtown area by providing a framework for enhancing and investing in properties and public projects located within the Downtown area, and this objective would not be achieved by its relocation elsewhere within the City of Oakley. Because the proposed project is location-specific, no alternative that considers a location other than the Downtown area for projected development under the proposed policy and zoning changes was further evaluated.

2. Existing General Plan and Zoning Alternative

An existing General Plan and Zoning alternative was considered but not further evaluated because the General Plan itself contains policies and programs that are intended to revitalize the Downtown, specifically: requiring preparation of a specific plan for the downtown area that promotes a vibrant downtown (Programs 2.3.C and 5.1.L) and preparation of design guidelines for commercial and residential structures in the downtown area, including signage guidelines (Program 2.3.A). Continued development and redevelopment within the Downtown area without a comprehensive development strategy and guidelines for development would be inconsistent with the intent of the General Plan. In addition, development under such an alternative would not meet any of the project objectives.

3. Separated Land Use Alternative

A separated land use alternative, where only commercial uses would be located within the DTSP-proposed Downtown Core (DSP-DC) and Downtown Support (DSP-DS) areas and only residential uses would be located within the Residential/Commercial Conversion Opportunity (DSP-R/CCO) area, was not considered because it would not meet the DTSP objectives for a mix of higher density uses within the Downtown area and would not substantially lessen any of the project impacts. Because most of the project impacts would not directly result from the location of residential uses within the Downtown Core or Support areas or result in adjacency conflicts between residential and commercial uses within any of the districts, evaluation of this alternative would not result in fewer project impacts and was therefore not further evaluated.

E. ENVIRONMENTALLY SUPERIOR ALTERNATIVE

CEQA requires the identification of the environmentally superior alternative in an EIR. The No Project alternative is considered the environmentally superior alternative in the strict sense that environmental impacts associated with its implementation would be the least of all the scenarios examined (including the proposed project). To maintain the Plan Area at baseline conditions would avoid each of the significant impacts that would result from implementation of the DTSP. However, while this alternative would be environmentally superior in the technical sense that contribution to these aforementioned impacts would not occur, the No Project alternative would also fail to achieve any of the project's objectives.

In cases like this where the No Project alternative is the environmentally superior alternative, CEQA requires that the second most environmentally superior alternative be identified. In this case, the Reduced Density alternative represents the next-best alternative in terms of a reduction in environmental impacts. The Reduced Density alternative would lessen (but not avoid) the impacts of the project that would result from increased traffic congestion, traffic-generated noise, construction-period noise and air pollution, greenhouse gas emissions, and energy consumption. It should be noted however, that the Reduced Density alternative would not lessen or avoid the significant unavoidable impacts to historic architectural resources, the Oakley Old Town District as a whole, or the potential impacts of selection of Option 2 for the Main Street Realignment. It should also be emphasized that the Reduced Density alternative would achieve the objectives of the DTSP to a lesser extent than would the proposed project.

VI. CEQA-REQUIRED ASSESSMENT CONCLUSIONS

As required by CEQA, this chapter discusses the following types of impacts that could result from implementation of the DTSP: growth-inducing impacts; significant irreversible changes; cumulative impacts; unavoidable significant effects; and effects found not to be significant. The focus of this chapter is on the DTSP. Subsequent development projects within the DTSP area may have project-specific impacts that would be addressed, as appropriate, on a project-by-project basis pursuant to CEQA.

A. GROWTH INDUCEMENT

A project is considered growth-inducing if it would directly or indirectly foster substantial economic or population growth, or the construction of additional housing.[1] Examples of projects likely to have significant growth-inducing impacts include extensions or expansions of infrastructure systems beyond what is needed to serve project-specific demand, and development of new residential subdivisions or industrial parks in sites that are currently only sparsely developed or are undeveloped. Typically, redevelopment projects on infill sites that are surrounded by existing urban uses are not considered growth-inducing because redevelopment by itself usually does not facilitate development intensification on adjacent sites.

The primary purpose of the DTSP is to guide public and private Downtown revitalization efforts in order to implement General Plan policies. As discussed in Chapter III, after implementation of the DTSP, there would be a net increase of 360,000 square feet of commercial space and up to 300 dwelling units within the Downtown. The addition of infill residential units would result in an increase of approximately 963 new residents within the DTSP area (see Appendix B, Initial Study for a more detailed discussion of population growth). This growth would represent an increase of approximately 2.9 percent of the City's current population and approximately 14 percent of the anticipated population growth through 2030. In addition, the DTSP anticipates approximately 360,000 square feet of new retail/commercial space, resulting in a net increase of approximately 665 new jobs. This job growth would represent approximately 18 percent of the City's current jobs and approximately 15 percent of the anticipated job growth through 2030. Although implementation of the DTSP would stimulate residential and economic growth in the DTSP area, direct plan-envisioned population and employment growth, as well as any indirect growth that it would generate, would not exceed the growth envisioned under the existing General Plan. Therefore, the proposed project would not lead to substantial population growth beyond that planned for the City. It would carry out the General Plan's vision of growth for Downtown Oakley.

The DTSP contains goals and objectives to be implemented first through policy changes and then through private and public development efforts, that would redevelop, revitalize, and rehabilitate the Specific DTSP area. The near-term and long-term opportunity sites that the DTSP identifies for future

[1] *CEQA Guidelines*, 2007. §15126.2(d).

development are all underutilized or vacant infill sites located in an existing urban area. Although implementation of the DTSP would include construction of a new roadway, the Main Street Realignment would provide a short bypass for vehicle and truck traffic in the area, diverting through traffic away from Main Street. Upgraded and improved infrastructure and service connections proposed as part of the DTSP are necessary to better serve both existing and future infill development in the DTSP area and would not facilitate development of surrounding areas. Implementation of the DTSP would not require the extension of utilities or roads into undeveloped sites, and would not directly or indirectly lead to the development of greenfield sites. Because the project site is located within an existing urbanized site and is served by transit, anticipated employment growth could reduce adverse impacts associated with automobile use, such as air pollution. Therefore, the growth that would occur as a result of DTSP implementation would not be considered substantial or adverse.

B. SIGNIFICANT IRREVERSIBLE CHANGES

An EIR must identify any significant irreversible environmental changes that could result from implementation of a proposed project. These may include current or future uses of non-renewable resources, and secondary or growth-inducing impacts that commit future generations to similar uses. CEQA dictates that irretrievable commitments of resources should be evaluated to assure that such current consumption is justified.[2] The *CEQA Guidelines* describe three distinct categories of significant irreversible changes: 1) changes in land use that would commit future generations; 2) irreversible changes from environmental actions; and 3) consumption of non-renewable resources.

1. Changes in Land Use Which Would Commit Future Generations

While implementation of the DTSP would encourage growth within the DTSP area, increased development would occur as infill or as re-use of urbanized sites that have been previously developed. The DTSP would seek to redevelop and revitalize the downtown portion of the City, which contains a mix of commercial, residential, civic, and light industrial uses, with commercial and retail space and high density residential uses. The DTSP area consists of a developed urban site within an existing Downtown, and the land use pattern that would be promoted by the DTSP is one that would support a pedestrian-friendly environment and allow for change as economic conditions evolve. Therefore, proposed changes in land use that would commit future generations would not constitute a substantial change.

2. Irreversible Changes From Environmental Actions

No significant irreversible environmental damage, such as what could occur as a result of an accidental spill or explosion of hazardous materials, is anticipated due to redevelopment activities associated with implementation of the DTSP. Compliance with federal, State and local regulations, and the mitigation measures identified in the Initial Study included as Appendix B (Section VII, Hazards and Hazardous Materials), would reduce to a less-than-significant level the possibility that hazardous substances within the DTSP area would cause significant environmental damage.

Beyond the potential irreversible effects of accidental hazardous substances releases, there are no other design or operational features of the DTSP or its anticipated development that would lead to

[2] *CEQA Guidelines*, 2007. §15126.2(c).

irreversible changes in the DTSP area. The land use designations and redevelopment envisioned by the DTSP would commit resources to these purposes for 30 to 50 years, but these choices would in no way be irreversible.

3. Consumption of Nonrenewable Resources

Consumption of nonrenewable resources includes conversion of agricultural lands, loss of access to mining reserves, and use of non-renewable energy sources. The DTSP area is located within urbanized Oakley. No agricultural lands exist within the DTSP area; therefore, none would be converted to non-agricultural uses. In addition, the site does not contain known mineral resources and does not serve as a mining reserve; thus, implementation of the DTSP would not result in the loss of access to mining reserves.

Implementation of the DTSP would increase the use of electricity, natural gas, and possibly other forms of energy with the DTSP area. New buildings constructed in the downtown would likely be more energy efficient than existing buildings. However, new structures could substantially increase consumption of nonrenewable fuel sources. Projects developed as part of the DTSP would be required to implement the energy efficiency measures listed in Mitigation Measure GCC-1 and to meet energy efficiency standards of the California Building Standards Code. The Building/Code Enforcement Division of the City of Oakley would review the design components and energy conservation measures of the individual building plans. With implementation of Mitigation Measure GCC-1 and applicable energy standards, implementation of the DTSP would have a less-than-significant impact with respect to the consumption of nonrenewable energy resources.

C. CUMULATIVE IMPACTS

CEQA defines cumulative impacts as “two or more individual effects which, when considered together, are considerable, or which can compound or increase other environmental impacts.” Section 15130 of the *CEQA Guidelines* requires that an EIR evaluate potential environmental impacts when the project’s incremental effect is cumulatively considerable. “Cumulatively considerable” means that the incremental effects of an individual 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. These impacts can result from a combination of the proposed project together with other projects causing related impacts. The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects.

1. Methodology

When evaluating cumulative impacts, CEQA allows the use of either a list of past, present, and probable future projects, including projects outside the control of the (lead) agency, or a summary of projections in an adopted planning document, or some reasonable combination of the two approaches. This cumulative analysis uses the development assumptions in the City’s General Plan.

2. Cumulative Effects of the Proposed Project

Potentially significant cumulative impacts to which the proposed project may contribute are discussed below for each topic evaluated in Chapter IV.

a. Cultural Resources. Construction activities associated with development projects occurring under the DTSP could result in significant impacts to archaeological resources and human remains. However, individual development projects would be subject to measures that protect identified and previously identified archaeological resources. Other foreseeable projects within the City would be subject to similar measures.

Implementation of the Main Street Realignment and development of Opportunity Sites identified in the DTSP would result in significant and significant and unavoidable impacts to individual historic structures within the Downtown as well as to the Old Town Oakley Historic District itself. Implementation of some of the mitigation measures recommended in Section IV.A, Cultural Resources would reduce these impacts to a less-than-significant level. However, demolition of historic structures would not be mitigated to a less-than-significant level, even with implementation of Mitigation Measures CULT-1 and CULT-4b. As such, these impacts would be significant and unavoidable. However, because these impacts are directly related to the revitalization strategy for the Downtown, and would be limited to the DTSP area, implementation of the DTSP would not result in a cumulatively considerable contribution to impacts on historic structures within the greater Oakley area.

b. Transportation, Circulation and Parking. Refer to Section IV.B, Transportation, Parking and Circulation, for a detailed description of the cumulative transportation-related effects of the proposed project. In the cumulative PM peak hour condition, the addition of project-related trips to the roadway network would be expected to worsen conditions or contribute to unacceptable operating conditions at the Main Street/Empire Avenue and Cypress Road/O'Hara Avenue intersections. However, cumulative impacts to roadway congestion would be reduced to a less-than-significant level with implementation of the recommended mitigation measures. If Option #2 of the Main Street Realignment (Main Street/Main Street Bypass/O'Hara Avenue Roundabout, Figure III-6b in Chapter III, Project Description) is implemented by the City, traffic congestion at this new intersection would result in a cumulatively considerable significant unavoidable impact.

c. Air Quality. Implementation of the DTSP would generate significant dust, exhaust, and organic emissions during construction activities. Depending on construction schedules for development projects within the DTSP area and planned development within the vicinity of the Downtown, generation of fugitive dust and pollutant emissions during construction may result in substantial short-term increases in air pollutants. However, each individual project would be subject to the rules and regulations, and other mitigation requirements during construction that are recommended by the Bay Area Air Quality Management District (BAAQMD) to reduce all construction-related emissions to a less-than-significant level. In addition, as described in Section IV.C, Air Quality, implementation of the DTSP would not conflict with the Bay Area 2005 Ozone Strategy and would not delay the plan's attainment goals for the Air Basin. Therefore, the Plan's contribution to cumulative air quality impacts would be less than significant.

d. Global Climate Change. Climate change is a global environmental problem in which any given development project contributes only a small portion of any net increase in global greenhouse gasses. Therefore, climate change is strictly a cumulative impact. Greenhouse gas emissions would be generated by implementation of the DTSP in the short- and long-term, and could interfere with the greenhouse gas emissions reductions planned as part of Assembly Bill 32. Implementation of the DTSP may also significantly increase the consumption of energy resources. However, greenhouse gases generated by development envisioned under the DTSP would be reduced to a less-than-significant level with implementation of Mitigation Measures GCC-1. Therefore, the Plan's contribution to cumulative global climate change impacts would be less-than-significant.

e. Noise. Implementation of the DTSP and cumulative projects would increase noise levels in Oakley and surrounding areas due to construction-period activity and increased traffic on City streets. Other foreseeable projects in Oakley would have similar impacts. However, noise increases associated with DTSP development would be limited to the DTSP area and would not adversely affect sensitive receptors after implementation of the mitigation measures recommended in Section IV.E, Noise. Therefore, the Plan's contribution to cumulative noise impacts would be less than significant.

D. SIGNIFICANT UNAVOIDABLE IMPACTS

As discussed in Section IV.A, Cultural Resources, demolition of historic architectural resources both as a result of the Main Street Realignment and development/redevelopment of Opportunity Sites would result in a significant unavoidable impact both to the individual resources and to the Oakley Old Town Historic District as a whole. Implementation of Mitigation Measures CULT-1a and CULT-4a, along with the other recommended mitigation measures, would reduce these impacts to a less-than-significant level. However, relocation of the buildings, as recommended in these mitigation measures, may not be feasible and may not be implemented. In addition, as discussed in Section IV.B, Transportation, Circulation and Parking, if Option #2 for the east end of the Main Street Realignment is implemented, traffic congestion at the Main Street/Main Street Bypass/O'Hara Avenue roundabout would result in a cumulatively considerable significant unavoidable impact in the cumulative plus project condition.

E. EFFECTS FOUND NOT TO BE SIGNIFICANT

Based on the analysis provided in the Initial Study (included as Appendix B), implementation of the DTSP is not expected to result in significant impacts related to the following topics, which are not further evaluated in the EIR.

1. Aesthetics

The DTSP area is visually characterized by highway-oriented commercial development with little continuity between buildings and street frontages. Several highly-visible vacant properties are located in the DTSP area and comprise approximately 40 percent of the site. In addition, buildings in need of façade repairs and segments of the Main Street frontage without curbs, sidewalks, or streetscape amenities typify the visual character of the Downtown. Implementation of the DTSP could change the visual character of the site and would include new construction, façade improvements to existing structures, and streetscape improvements including installation of sidewalks, street lights, curb and gutters, and new street signs. These changes would result in an improvement to the visual character of the Downtown and surrounding area. Implementation of the DTSP would not substantially alter any scenic vistas and is not located within view of a State scenic highway. Implementation of Mitigation Measure AES-1, which requires that individual lighting plans be evaluated to ensure that new development does not create substantial light or glare, would reduce potential impacts to day and nighttime views in the area to a less-than-significant level.

2. Agricultural Resources

The DTSP area includes parcels that are currently vacant fields. However, the DTSP site is surrounded by residential and commercial development and is designated as "Urban and Built-Up Land" by the Department of Conservation's Farmland Mapping and Monitoring Program;[3] therefore, implementation of the DTSP would not convert farmland to a non-agricultural use. The DTSP area includes the following zoning districts: Mixed Use Area (MU); Commercial (CO); Multiple Family Residential-Low Density (ML); Single Family Residential-High Density (SH); Public/Semi Public (PS); and Light Industrial (LI) and is not under a Williamson Act contract. Therefore, implementation of the DTSP would not conflict with existing zoning for an agricultural use or a Williamson Act contract. In addition, implementation of the DTSP would not result in the extension of infrastructure into an undeveloped area or other physical changes that would result in the conversion of farmland to non-agricultural uses.

3. Biological Resources

Due to the urban setting and past agricultural land uses within the DTSP site, it is unlikely that special status species, including those covered under the East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan (ECC HCP/NCCP) would occur within the DTSP site. Wildlife species that do occupy the site are typically common species that easily adapt to disturbed, urban conditions. The site is not located within a migratory wildlife movement corridor and does not support any riparian habitats, other sensitive natural communities, or federally protected wetlands. Implementation of the DTSP would comply with the City's Heritage Tree Ordinance and the requirements of the ECC HCP/NCCP.

There is a potential for burrowing owls and Swainson's hawks to use the vacant open areas within the DTSP area for nesting. Construction activities could result in adverse impacts to these species. Implementation of Mitigation Measure BIO-1 would reduce potential impacts to burrowing owls and Swainson's hawks to a less-than-significant level.

4. Paleontological Resources

The geology of the area consists of Holocene stream channel deposits to a considerable depth and has a low sensitivity for paleontological resources. While unlikely, construction activities, including demolition and grading, have the potential to uncover previously unrecorded paleontological resources. Implementation of Mitigation Measure PALEO-1 would reduce potential impacts to paleontological resources to a less-than-significant level.

5. Geology and Soils

The San Francisco Bay region is a seismically active region that is subject to large earthquakes; implementation of the DTSP would expose additional structures to moderate regional seismic risks. However, compliance with applicable building codes and implementation of Mitigation Measure GEO-1 would ensure that DTSP development/redevelopment projects reduce potential impacts

[3] California Department of Conservation, 2009. Contra Costa County Important Farmland Map 2008. Website: www.conservation.ca.gov/DLRP/fmmp/Pages/Index.aspx. June.

related to seismic groundshaking, liquefaction, and other unstable soil conditions in the DTSP area to a less-than-significant level.

6. Hazards and Hazardous Materials

Based on a Phase 1 Environmental Site Assessment completed in 2005 for portions of the Downtown area, there are parcels within the within the DTSP site where hazardous materials had been used historically or are currently used. Additionally, older buildings constructed prior to the 1980s may contain lead-based paint (LBP) and/or asbestos-containing materials (ACM). Demolition of these structures may release lead particles and asbestos fibers into the air, where they could pose a health risk to construction workers and the general public. Land disturbing activities within the DTSP area and demolition of structures constructed prior to 1980 could result in accidental upset or release of hazardous materials. Implementation of Mitigation Measures HAZ-1a, -1b, and -1c and Mitigation Measure HAZ-2 would reduce potential exposure of construction workers and sensitive receptors to hazardous materials associated with past uses on individual sites and LBP and/or ACM to a less-than-significant level. Implementation of Mitigation Measures HAZ-3a and -3b would ensure that implementation of the DTSP would not interfere with an adopted emergency response plan or emergency evacuation plan. In addition, implementation of the DTSP would not expose people or structures to a significant risk of loss, injury or death involving wildland fires.

7. Hydrology and Water Quality

Implementation of the DTSP would not 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, either directly or indirectly. However, construction activities and post-construction land uses that would be developed as part of the DTSP could result in degradation of water quality in nearby surface water bodies by reducing the quality of stormwater runoff. In addition, the area of impervious surfaces would increase with implementation of the DTSP and development of vacant land. Increased runoff quantities and rates could contribute to substantial erosion or siltation and flooding on- or off-site. Implementation of Mitigation Measure HYD-1a and HYD-2a and -2b would reduce construction- and operation-related impacts to water quality and the area drainage pattern and to a less-than-significant level.

In addition, two areas in the south/central DTSP area are located in the 100-year floodplain (along Landis Avenue between Norcross Lane and O'Hara Avenue and along Second Street between E. Ruby Street and Las Dunas Avenue). Redevelopment in these areas could place or improve housing within a 100-year flood hazard area; however, implementation of General Plan Policy 8.2.1 and Mitigation Measure HYD-3 would ensure that potential impacts associated with placing housing in a 100-year floodplain would be reduced to a less-than-significant level.

8. Land Use and Planning

Implementation of the DTSP would not divide an established community. The City of Oakley General Plan designates a Downtown Mixed-Use Special Planning Area which coincides with part of the area within the DTSP site. The General Plan vision for this special planning area includes the intensification of commercial and residential uses to establish a core activity center for the downtown. Implementation of the DTSP is consistent with the City of Oakley General Plan.

9. Mineral Resources

The DTSP site is located in a developed urban area. There are no known mineral resources or mineral resources processing facilities present within the site or vicinity, and implementation of the DTSP would not result in the loss of availability of a known mineral resource of value.

10. Population, Employment and Housing

Implementation of the DTSP could result in an increase of approximately 963 residents to the DTSP area and could create up to 665 new jobs. However, this direct plan-envisioned population and employment growth, as well as any indirect growth that it would generate, would not be substantial as a proportion of overall anticipated City growth in the coming decades. Implementation of the DTSP could also result in the displacement or conversion of existing commercial and residential structures; however, the DTSP anticipates a net increase of approximately 300 new dwelling units. These new units would offset the potential loss of housing that may result from implementation of the DTSP. Therefore, the DTSP would not result in the displacement of substantial numbers of people.

11. Public Services

Development occurring under the DTSP would be adequately served by existing public services, including: police protection, schools, and parks. However, traffic congestion, building type, and occupancy loads can affect fire services in the Downtown. Currently, the East County Fire Protection District Type 1 engine at Station 93 has a 35-foot ladder, which can serve up to two-story buildings. The DTSP allows for construction of buildings up to a maximum of four floors and/or 50 feet in height. If buildings taller than two stories are constructed prior to the acquisition of a ladder/engine to serve higher buildings, then adequate fire protection services would not be maintained in the Downtown. Implementation of General Plan Policies 8.4.3 and 8.4.4, along with implementation of Mitigation Measure PUB-1, would ensure that new development/redevelopment would be adequately served by the East County Fire Protection District and would reduce this impact to a less-than-significant level.

12. Recreation

The population increase associated with implementation of the DTSP would result in an incremental increase in the use of neighborhood and community parks and recreational facilities serving the DTSP site, including the Oakley Fire District Station No. 93 park, Civic Center Plaza/Park, Oakley Elementary School (joint use playfields and park), and Laurel Ballfields Park. However, the incremental increase in park and recreational facility use that would be generated by the proposed project would not result in substantial physical deterioration of these areas.

13. Utilities and Service Systems

The DTSP site is located in an urban area that is already served by utilities and public service systems. The DTSP implements the vision of the Oakley 2020 General Plan and would not create substantial new unanticipated water demand or water and wastewater treatment. Sewer infrastructure within the DTSP area is generally old and does not meet the standard 8-inch minimum sizing requirements. Implementation of General Plan Policy 4.9.4 and Programs 4.9.A and 4.9.D from the Wastewater Services section of the Growth Management Element along with implementation of Mitigation Measures UTL-1a and UTL-1b would reduce this impact to a less-than-significant level. In addition, existing stormwater infrastructure serving the DTSP area is adequate to convey additional runoff from projects developed under the DTSP. Therefore, implementation of the DTSP would not result in the construction or expansion of stormwater drainage facilities, the construction of which could cause significant environmental effects.

VII. REPORT PREPARATION

A. REPORT PREPARERS

LSA Associates, Inc., Prime Consultant: *Project Management and Report Production; Air Quality; Global Climate Change; Noise; Alternatives;* and *CEQA Required Assessment Conclusions*

2215 Fifth Street
Berkeley, CA 94710

David Clore, AICP, Principal-in-Charge
Theresa Bravo, Project Manager
Hannah Young, Planner
Amy Fischer, Senior Planner
Jason Paukovits, Senior Air Quality/Global Climate Change Planner
Phil Ault, Noise/Air Specialist
Patty Linder, Graphics Manager
Jennifer Morris, Word Processor

LSA Associates, Inc.: *Cultural Resources*

157 Park Place
Point Richmond, CA 94801

Christian Gerike, Principal, Cultural Resources
Andrew Pulcheon, AICP, Cultural Resources Manager
Michael Konzak, Archeologist

Fehr & Peers: *Transportation, Circulation and Parking*

100 Pringle Avenue, Suite 600
Walnut Creek, CA 94596

Julie K. Morgan, AICP, Principal
Sam Tabibnia, P.E., Associate

B. REFERENCES

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APPENDIX A

NOP AND COMMENT LETTERS

CITY *of* OAKLEY

A PLACE *for* FAMILIES *in the* HEART *of the* DELTA

NOTICE OF PREPARATION OF A DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE OAKLEY DOWNTOWN SPECIFIC PLAN

To: OPR, Responsible and Trustee Agencies, and Interested Parties

Subject: Notice of Preparation of a Draft Environmental Impact Report

Project Title: Oakley Downtown Specific Plan

The City of Oakley is the lead agency for the preparation of an Environmental Impact Report (EIR) for the Oakley Downtown Specific Plan. Once a decision is made to prepare an EIR, the lead agency must prepare an NOP to inform all responsible and trustee agencies that an EIR will be prepared (CEQA Guidelines Section 15082). 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 may 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 (ATTACHMENT 1). A copy of the Initial Study (☐ is or ☒ 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:

City of Oakley
Attn: Ken Strelo, Senior Planner
3231 Main Street
Oakley, CA 94561

Scoping Meeting: The City of Oakley will conduct a Scoping Meeting to consult directly with the interested agencies and members of the public in regards to the contents of the Environmental Impact Report. The Scoping Meeting will be held on Friday December 5, 2008 at 1:00 pm at City Council Chambers, 3231 Main Street, Oakley, CA 94561. Members of the public and interested agencies will have the opportunity at this time to submit comments on the scope and contents of the Environmental Impact Report. If you have questions about the time and place of the Scoping Meeting please contact Barbara Mason at (925) 625-7016.

Date: November 20, 2008

Signature: Kenneth W. Strelo

Kenneth W. Strelo, Senior Planner
Telephone: (925) 625-7000

NOTICE OF PREPARATION
OF A DRAFT ENVIRONMENTAL IMPACT REPORT
FOR THE OAKLEY DOWNTOWN SPECIFIC PLAN

ATTACHMENT 1

1. Project Title:
Oakley Downtown Specific Plan (DTSP)

2. Lead Agency Name and Address:
City of Oakley
3231 Main Street
Oakley, CA 94561

3. Contact Person and Phone Number:
Rebecca Willis, Community Development Director
Phone Number: (925) 625-7000

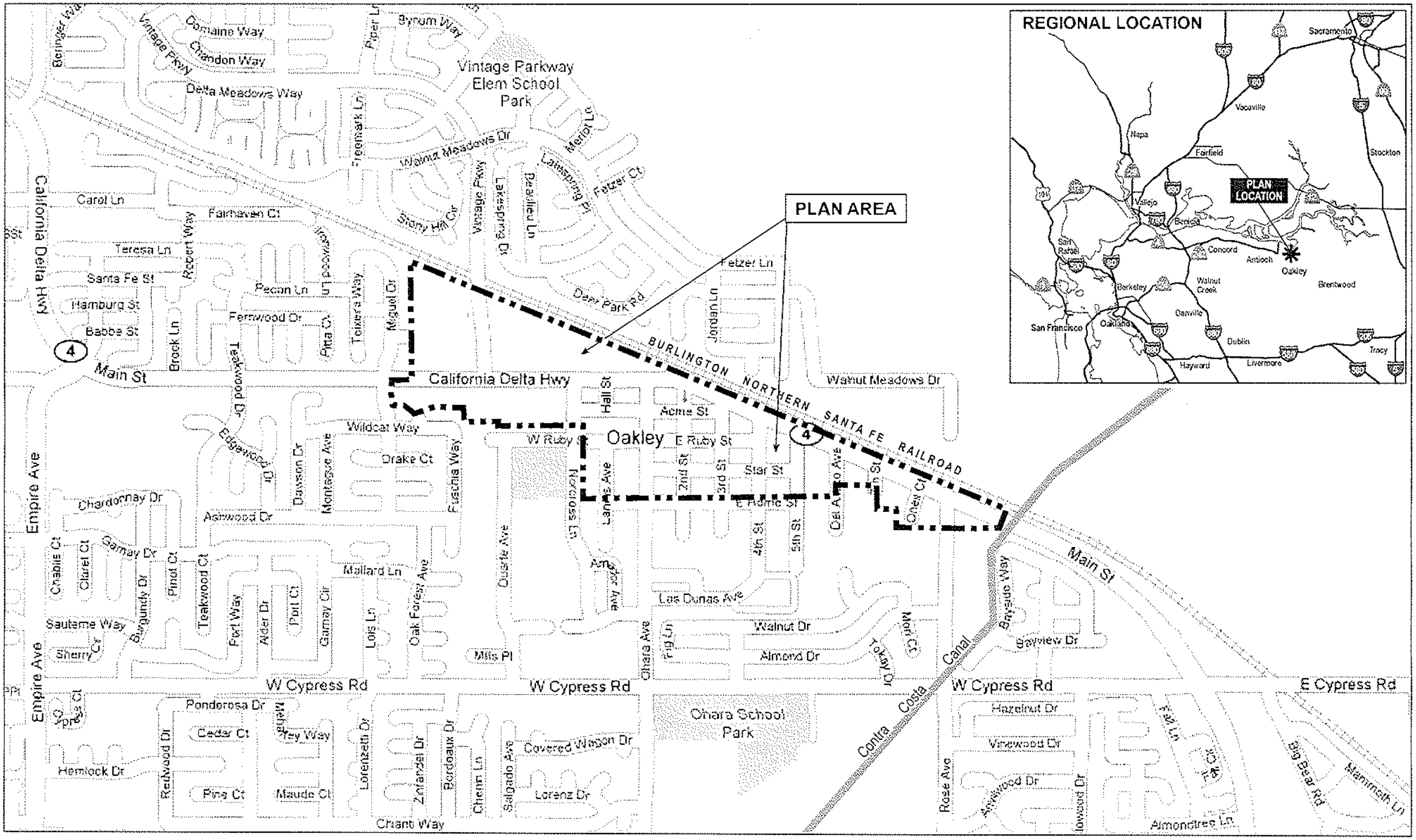
4. Project Location:
The Downtown Specific Plan Area is generally located along both sides of Main Street, between Miguel Drive to the west and the Contra Costa Canal to the east, as shown in Figure 1. The Burlington Northern Santa Fe (BNSF) Railroad line forms the northern border of the DTSP Area and Home Street is the southern boundary. The Main Street frontage in this area, which is approximately 4,800 linear feet in length, serves as the focus of the DTSP.

5. Project Sponsor's Name and Address:
City of Oakley
Redevelopment Agency
3231 Main Street
Oakley, CA 94561

6. Existing General Plan Designations:
Commercial Downtown
Single Family Residential-High Density
Multiple Residential-Low Density
Public and Semi-Public

7. Existing Zoning:
P-1 (Includes Land Uses within the Redevelopment Area Planned Unit District)

- Commercial (CO)
- Mixed Use Area (MU)
- Single Family Residential-High Density (SH)
- Multiple Family Residential-Low Density (ML)
- Public/Semi-Public (PS)



LSA

FIGURE 1

LEGEND

PLAN AREA

0 650 1300
FEET

Downtown Specific Plan NOP

Project Vicinity and Regional Location

SOURCE: GOOGLE MAPS. 2006.

I:\OKY0601 oakley\figures\NOP\Fig_1.ai (11/6/08)

8. Project Description Summary:

The Downtown Specific Plan would implement the Oakley 2020 General Plan policies for the Downtown through programs and capital improvement projects that the City will pursue in coming years to realize the community's Downtown vision. The Plan Area totals approximately 80 acres and contains a range of land uses and types of development including: older storefront commercial buildings; small-scale highway commercial development; light-industrial; auto-related development; and residential uses. Approximately 40 percent of the properties in the Downtown Core (approximately 29 acres) are vacant.

The Plan provides strategies to redevelop the area with commercial and residential uses, to enhance existing developed areas with streetscape improvements and to renovate existing buildings. The Plan identifies potential redevelopment opportunity sites and revitalization projects that would contribute to creating a vibrant Downtown. As part of the improvements to the Downtown area, a Main Street Realignment would be constructed, which would reduce truck and through-traffic on Main Street and would create additional street frontage to accommodate downtown businesses. Implementation of the Specific Plan could result in the development of up to 360,000 square feet of commercial space and up to 300 dwelling units.

As shown in Figure 2, the Downtown Specific Plan establishes three subareas and provides development standards for each of the areas as summarized below.

- **Downtown Core Area (DC)**. This subarea would have multi-story buildings with active first-floor retail, restaurant, and related uses. Upper floors may be commercial and/or residential uses.
- **Downtown Support Area (DS)**. This subarea would have a mix of commercial, office, and infill residential uses to support the Downtown Core.
- **Residential/Commercial Conversion Opportunity Area (R/CCO)**. This subarea would remain primarily residential, with a mix of some office and commercial business in renovated buildings. This area is intended to accommodate small-scale "non-Main Street" office and commercial uses through the conversion of residential buildings.

Potential redevelopment opportunity sites identified in the Plan either exist today (near-term) or will be created by the Main Street Realignment (long-term), as shown in Table 1. Figure 3 shows the location of these redevelopment opportunity sites.

The Downtown Specific Plan envisions the construction of capital improvement projects intended to enhance transportation and safety in the Downtown, support revitalization, and enhance the Downtown image and pedestrian experience. These projects are summarized below.

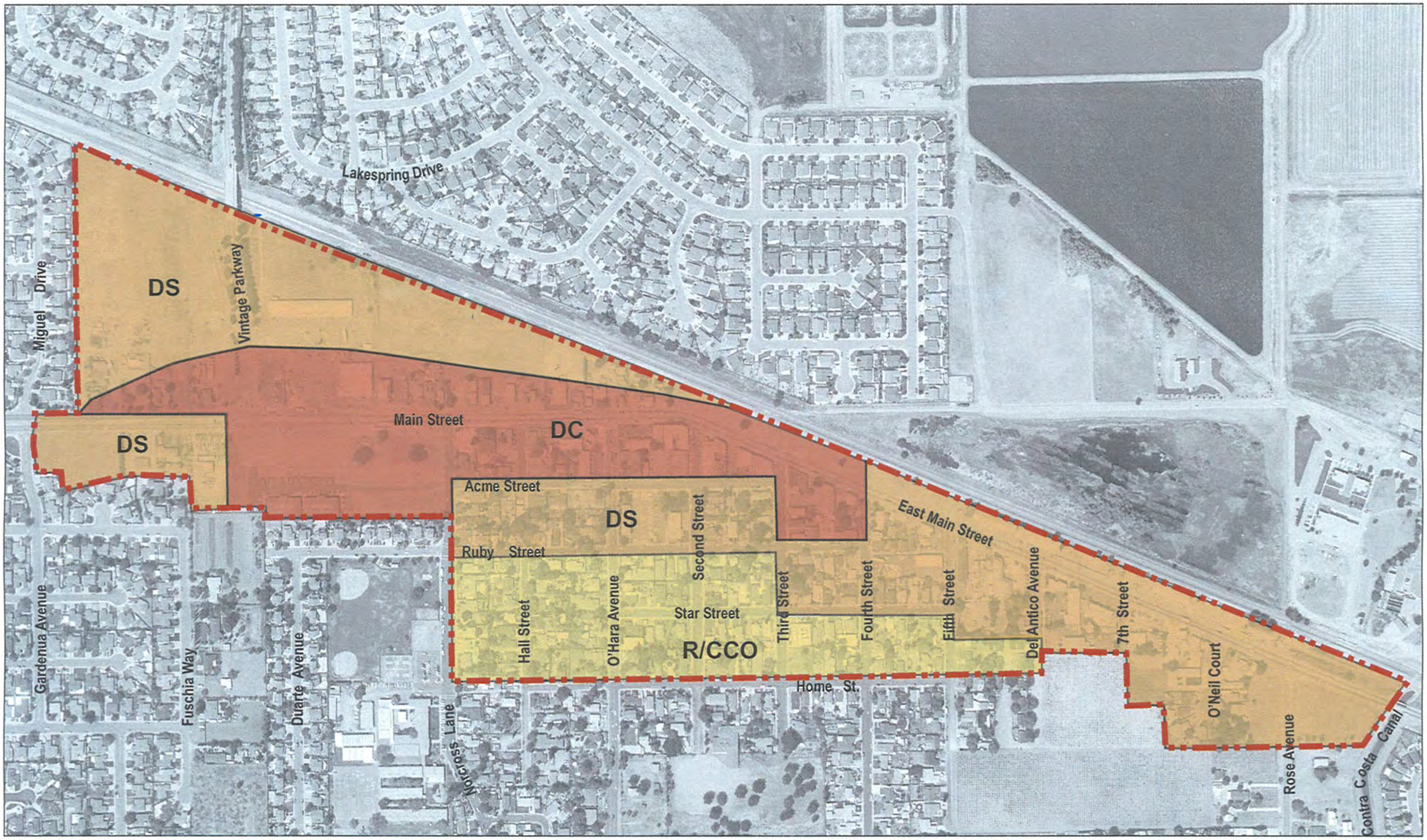
- **Main Street Realignment.** The Main Street Realignment is the primary capital improvement called for by the Plan. The Realignment would consist of an approximately half-mile new four-lane northerly bypass of Main Street, from just east of Miguel Drive to just west of Second Street as shown in Figure 3. The Realignment would carry commuter and through-traffic, while allowing the existing Main Street to be narrowed and become a pedestrian and business-friendly commercial street. The Realignment would require removal of approximately 13 buildings.

Table 1: Potential Redevelopment Opportunity Sites

Site	Acreage	Current Use	Proposed Use
Near-Term Opportunity Sites			
1. City Hall/ Civic Center	6.9	City Hall, park and restaurant	Additional governmental/quasi-governmental uses
2. Centro Mart Frontage	2.2	Grocery store, surface parking, 2 restaurants	Ground floor commercial (possibly grocery) and second floor residential/office
3. East Main Street	4.0	Commercial uses; vacant; property owned by BNSF railroad	Commercial development
7/8. Infill Sites	NA	Commercial and residential uses	Storefront commercial district
Long-Term Opportunity Sites			
4. Oakley Plaza	3.6	Existing strip commercial, parking and vacant land	"Medium box" commercial
5. Main Street Triangle	1.4	Residential uses; site will be created by the Realignment	Gateway feature and commercial development
6. Vintage Parkway Site	10.7	Primarily vacant; some residential uses	Commercial and/or residential

Source: City of Oakley, 2008.

- **Main Street Frontage and Streetscape**. The Downtown Specific Plan envisions streetscape improvements including widening of Main Street within the core area, installation of curbs, gutters, sidewalks, and landscaping.
- **East Main Street Widening and Streetscape**. East Main Street would be widened and frontage improvements including streetlights, sidewalks and landscaping would be installed.
- **Downtown Side Street Improvements**. The Downtown Specific Plan recommends improvements for side streets located within the immediate Downtown Core area including Norcross Lane, Hall Street, O'Hara Avenue, Second Street, and Third Street. Improvements would include pavement overlays, installation of traffic signals, frontage improvements, and parking.
- **Infrastructure Projects**. The Plan recommends construction of public parking lots, undergrounding of utilities, and improvements to the sanitary sewer system and drainage system, where necessary.
- **Building Facade Improvements**. The City's Façade Improvement Program would be utilized to support revitalization efforts in the Downtown.
- **Downtown Gateway Signs and Directional Signs**. Gateway areas would be created from "remnant" properties resulting from construction of the Realignment and gateway and directional signage would be installed for the Downtown area.



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LEGEND

DOWNTOWN CORE (DC) AREA

DOWNTOWN SUPPORT (DS) AREA

RESIDENTIAL/COMMERCIAL CONVERSION OPPORTUNITY (R/CCO) AREA

PROJECT BOUNDARY

FIGURE 2

Downtown Specific Plan NOP

Downtown Specific Plan Subareas

SOURCE: GLOBEXPLORER, MAY 2006; BOTTOMLEY ASSOCIATES, 2008.

I:\OKY0601 oakley\figures\NOP\Fig_2.ai (11/6/08)

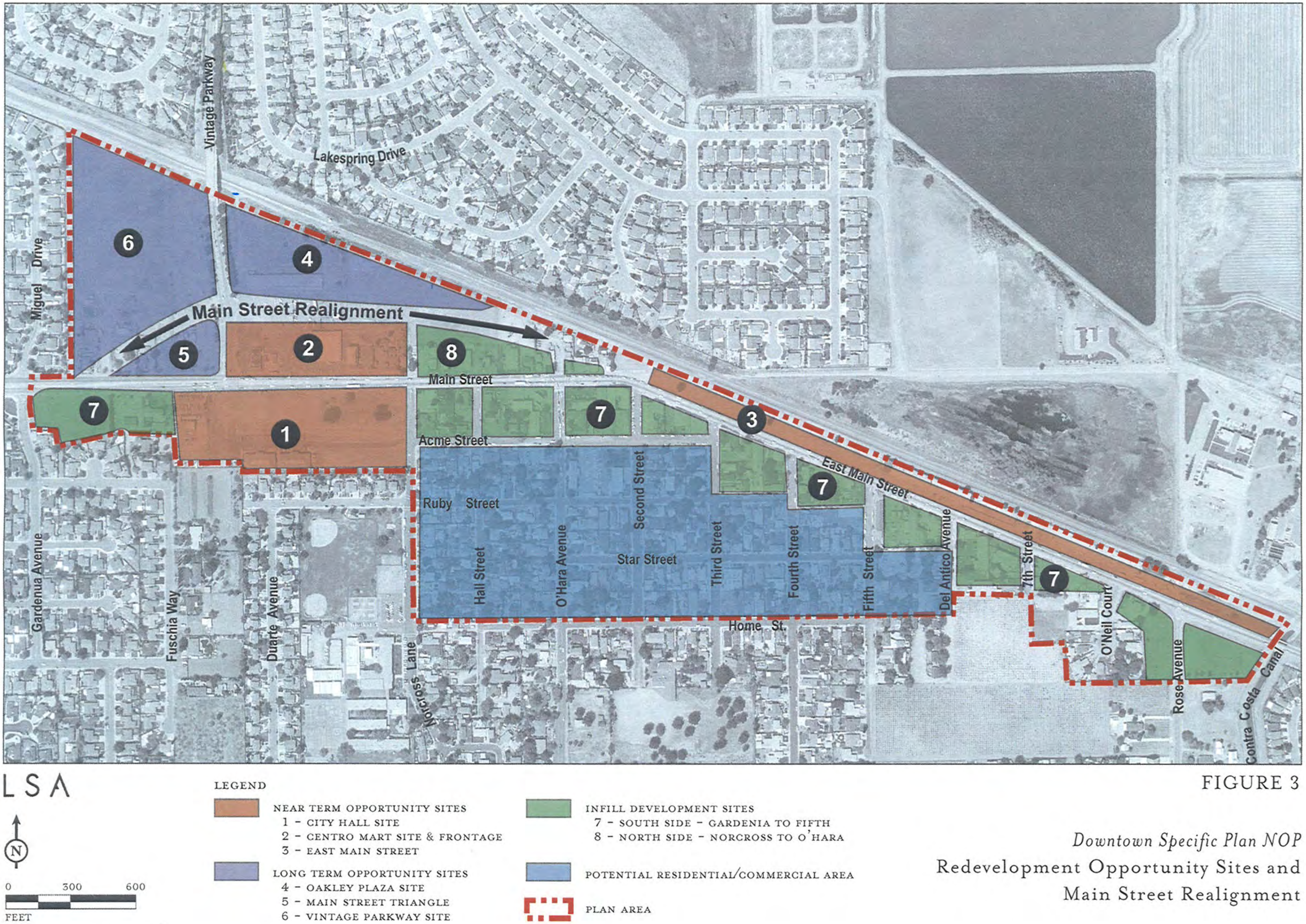


FIGURE 3

Downtown Specific Plan NOP

Redevelopment Opportunity Sites and Main Street Realignment

SOURCE: GLOBEXPLORER, MAY 2006: BOTTOMLEY ASSOCIATES, 2008.

I:\OKY0601 oakley\figures\NOP\Fig_3.ai (11/6/08)

9. Environmental Issues to be Addressed:

The City has determined that an EIR is required for this project. The EIR will focus on the potentially significant effects of the project and will document the reasons for concluding that other effects will be less-than-significant. The Draft EIR will analyze a broad range of potential environmental impacts associated with the implementation of the Downtown Specific Plan and will address the following environmental issues and topics: Land Use and Planning; Population, Employment, and Housing; Agricultural Resources; Cultural Resources; Transportation and Circulation; Air Quality; Global Climate Change; Noise; Biological Resources; Hydrology and Water Quality; Geology, Soils, and Seismicity; Mineral Resources; Hazards and Hazardous Materials; Public Services and Recreation; Infrastructure and Utilities; Visual Resources; Alternatives Analysis; and Cumulative and Growth Inducing Impacts.

CONTRA COSTA WATER DISTRICT
1331 Concord Avenue
P.O. Box H20
Concord, CA 94524
(925) 688-8000 FAX (925) 688-8122

RECEIVED
DEC 09 2008
CITY OF OAKLEY
faxed 12/5/08

December 5, 2008

VIA FACSIMILE (925) 625-9194
Hard Copy to Follow

Mr. Ken Strelo, Senior Planner
City of Oakley Community Development Dept.
3231 Main Street
Oakley, CA 94561

Subject: Comments on the Notice of Preparation for the Draft Environmental Impact Report for the Oakley Downtown Specific Plan

Dear Mr. Strelo:

The Contra Costa Water District (CCWD) has reviewed the Notice of Preparation (NOP) for the Environmental Impact Report (EIR) for the Oakley Downtown Specific Plan.

CCWD manages and maintains water facilities that are owned and operated by the United States Bureau of Reclamation (Reclamation). This includes the Contra Costa Canal (Canal) as well as a number of untreated water laterals. The Canal is located on the eastern edge of the Specific Plan area and Lateral 5.3 is within the project area on the west side of the project. In addition, there is a roadway undercrossing from State Route 4 west of the Canal that accesses Ironhouse Sanitary District, Diablo Water District and CCWD facilities north of the Burlington Northern Santa Fe Railroad tracks. The Oakley Downtown Specific Plan project has the potential to adversely affect the Canal, Lateral 5.3, and the undercrossing in the project area. The Specific Plan's area map illustrating Reclamation and CCWD facilities in the project area is attached.

CCWD recommends that conditions for approving the project include the following:

-CCWD will need to review the EIR when it is circulated.

-NEPA review will be required in the event that the Oakley Downtown Specific Plan requires any actions by Reclamation, with respect to its fee-owned property and easements.

-The Specific Plan should note that if there is a need to encroach on Reclamation property that CCWD must be notified and an encroachment permit issued.

-City of Oakley shall provide to CCWD details on how future land developers will prevent the project from potentially impacting the Canal, Lateral 5.3, and the undercrossing during construction.

-Any proposed project drainage plan should avoid discharges to the adjacent Contra Costa Canal.

-A six foot high property line fence is required to protect the Canal as well as a liner fence, if not already installed. Any damage to existing Canal fences from construction must be repaired to the satisfaction of CCWD.

-Reclamation and CCWD pipelines must be protected from damage by heavy construction equipment possibly crossing or working adjacent to the Canal, Lateral 5.3, and the undercrossing. Prior to any grading or crossing of these facilities with heavy equipment, City of Oakley must provide CCWD with information on the type and weight of equipment that will be crossing the facilities, identify how their work may impact the existing facilities, and identify their proposed mitigation and protection measures.

- If projects within the Downtown Oakley Specific Plan require a shutdown of Reclamation laterals for any reason, project proponents within the Specific Plan area must comply with CCWD's requirements for maintaining service to existing treated and untreated water customers.

Please contact Chris Hentz at CCWD regarding engineering issues at (925) 688-8311. Alternatively, I may be contacted at (925) 688-8119 should you have further questions.

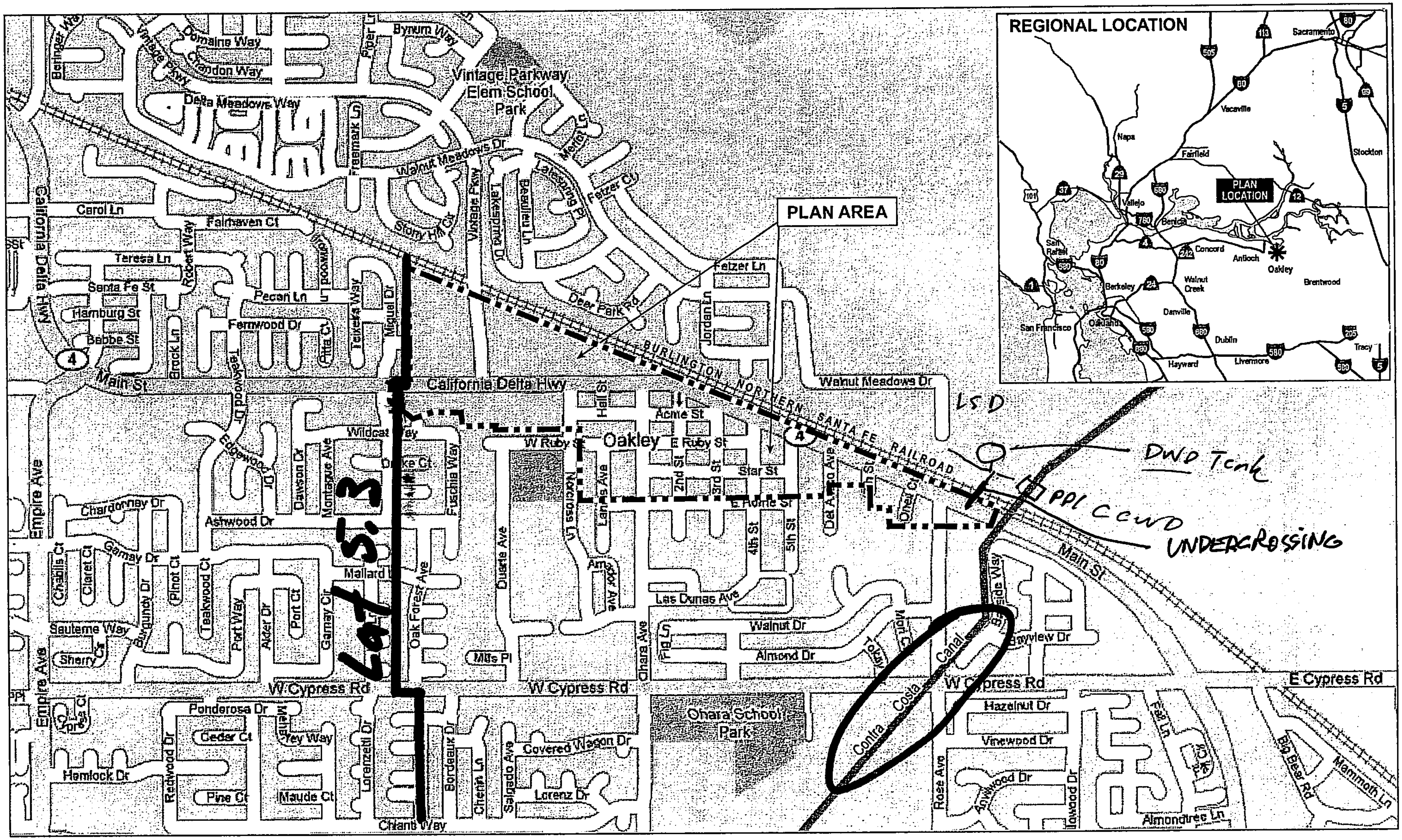
Sincerely,

Mark A. Seedall

Mark A. Seedall
Senior Planner

MAS/jmt

Attachment



LSA

FIGURE 1

Downtown Specific Plan NOP

Project Vicinity and Regional Location

0 650 1300

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LEGEND

PLAN AREA

SOURCE: GOOGLE MAPS, 2006.

I:\OKY0601 oakley\figures\NOP\Fig_1.ai (11/6/08)

Contra Costa County
Flood Control
& Water Conservation District

Julia R. Bueren,
ex officio Chief Engineer
R. Mitch Avalon,
Deputy Chief Engineer

December 15, 2008

Ken Strelo
City of Oakley
3231 Main Street
Oakley, CA 94561

Our Files: 97-29C, 29D, 29E

Dear Mr. Strelo:

We have reviewed the Notice of Preparation (NOP) of a Draft Environmental Impact Report (DEIR) for the Oakley Downtown Specific Plan Project. This project is located along both sides of Main Street, between Miguel Drive to the west and the Contra Costa Canal to the east, and the Burlington Northern Santa Fe Railroad line to the North. We received the NOP on November 24, 2008, and have the following comments:

1. This project is located in three formed Drainage Areas (DA), DA 29C, DA 29D, and DA 29E. All developments within the Oakley Downtown Specific Plan west of Rose Avenue are subject to a drainage fee in accordance with the Contra Costa County Flood Control and Water Conservation District Ordinance Number 2006-46, 2006-47, and 2006-48, respectively. By ordinance, all building permits and subdivision maps filed in this area are subject to the provisions of the drainage fee ordinance. Effective February 19, 2007, the current fee in these two drainage areas is $0.67, $1.71, and $1.60 per square foot of newly created impervious surface, respectively. The City of Oakley (City) should collect the fees during the development process, prior to the issuance of building permits or the recordation of the final maps. These fees pay for drainage improvements that help mitigate the increased runoff generated by new development.

2. The Contra Costa County Flood Control & Water Conservation District (FC 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 regularly adjusts its drainage fees to reflect increasing construction costs. The drainage fee rate does not vest at the time of project approval. The drainage fees due and payable will be based on the fee in effect at the time of fee collection.

3. We request that the DEIR provide a map of the project area with the drainage area boundaries.

4. We request that the DEIR provide a map of the watersheds where the project is located, including watershed boundaries.

5. The FC District's DA 29C, DA 29D, and DA 29E facilities were designed based on the 1987 Oakley Area General Plan. The Specific Plan changes some areas designated as

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255 Glacier Drive Martinez, CA 94553-4825
TEL: (925) 313-2000 • FAX: (925) 313-2333
www.cccpublicworks.org

Residential (R-60) to commercial. This increase in development density will produce higher volume of runoff. If the existing and proposed facilities are not adequate for the proposed development density, the DEIR should discuss proposed mitigation measures.

6. The remaining portion of Line J as part of DA 29C/29D plans should be completed prior or as part of this project. Subdivision 8728, Cypress Estates, was conditioned to install this line. As of date, the developer would like to install only the portion within the subdivision. If the developer does not install the full length of Line J, the City should install it as part of this project or enter into a right of way acquisition agreement for future installation.

7. The DEIR should discuss the impacts from not fully installing Line J per DA 29C/29D fees.

8. Developers may be eligible for credit against the portion of the drainage fees for eligible costs associated with construction of drainage area facilities (Line J of Drainage Area 29C/29D, Lines "E1" and "E2," and Detention Basin #3 of Drainage Area 29E). The drainage fees can be credited for up to 80% of the eligible costs, provided such work is in compliance with the FC District's Drainage Area plans and construction plans are approved by the FC District. Drainage lines not in compliance with the FC District's Drainage Area plans will require that a storm drain study and annotated hydrology maps be submitted for review and approval of the FC District for reimbursement consideration. Once the FC District agrees with the alignment of the storm drain lines, the developer will need to first contact the FC District and enter into a reimbursement agreement in order to determine eligible costs. Reimbursement for work that exceeds development's drainage fee obligation would be based upon a signed reimbursement agreement prior to performance of the work between the developer and the FC District. Review of development plans and hydrology/hydraulic calculations for conformance with our drainage area plan falls under the FC District's Fee-For-Service program. Calculation of the eligible construction costs and fee credit also falls under the FC District's Fee-For-Service program.

9. According to our records, alternatives have been studied for DA 29E facilities. The City should review these alternatives and develop a Drainage Master Plan for this specific area. This plan should be approved by the City and the FC District prior to allowing further development in the area. The Drainage Master Plan should include detailed hydrologic modeling of the watershed that considers land use, existing facilities, soil conditions, and topographic data. The Drainage Master Plan should also result in a plan with descriptions of proposed flood control facilities (which typically include basins, channels and storm drains), compliance with discharge and water quality requirements, cost estimates, and schedules.

10. In the Hydrology Section, please identify and show all existing watercourses, tributaries, and man-made drainage facilities within the project site that could be impacted by this project. The discussion should include an analysis of the capacity of the existing watercourses.

11. The Hydrology Section should quantify the amount of runoff that would be generated by the project and discuss how the runoff entering and originating from the site would be distributed between the natural watercourses, the detention basins, and the man-made drainage facilities.

12. We recommend that the DEIR address the design and construction of storm drain facilities to adequately collect and convey stormwater entering or originating within the development to the nearest adequate man-made drainage facility or natural watercourse, without diversion of the watershed, per Title 9 of the County Ordinance Code.

13. The DEIR should discuss the adverse impacts of the runoff from the project site to the existing drainage facilities, and drainage problems in the downstream areas, including those areas outside of the City of Oakley.

14. The FC District should be included in the review of all drainage facilities that have a region-wide benefit, that impact region-wide facilities, or that impact FC District-owned facilities. The FC District is available to provide technical assistance during the development of the DEIR, including hydrology and hydraulic information and our HYDRO6 method, under our fee for service program.

We appreciate the opportunity to comment on the NOP submittal and welcome continued coordination. We look forward to reviewing the Draft EIR (DEIR), which should address our comments. If you should have any questions, please contact Jane Kao at (925) 313-2179 or jkao@pw.cccounty.us; alternately, you can contact me at (925) 313-2363 or trie@pw.cccounty.us.

Sincerely,

Teri E. Rie
Associate Civil Engineer
Contra Costa County Flood Control
& Water Conservation District

TR:JK:xx
G:\FldCtl\CurDev\CITIES\Oakley\Oakley Downtown Specific Plan\SP Comments.doc
Enclosures

c: Greg Connaughton, Flood Control
Tim Jensen, Flood Control

STATE OF CALIFORNIA

Arnold Schwarzenegger, *Governor*

PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3298

December 22, 2008

Ken Strelo
City of Oakley
3231 Main Street
Oakley, CA 94561

CITY OF OAKLEY
Community Development Dept

DEC 26 2008

PLANNING DIVISION
RECEIVED
Email 12/22/08

Re: Notice of Preparation, Draft EIR
Oakley Downtown Specific Plan
SCH# 2008112089

Dear Mr. Strelo:

As the state agency responsible for rail safety within California, the California Public Utilities Commission (CPUC or Commission) recommends that development projects proposed near rail corridors be planned with the safety of these corridors in mind. New developments and improvements to existing facilities may increase vehicular traffic volumes, not only on streets and at intersections, but also at at-grade highway-rail crossings. In addition, projects may increase pedestrian traffic at crossings, and elsewhere along rail corridor rights-of-way. Working with CPUC staff early in project planning will help project proponents, agency staff, and other reviewers to identify potential project impacts and appropriate mitigation measures, and thereby improve the safety of motorists, pedestrians, railroad personnel, and railroad passengers.

As development is proposed in and around the Downtown area, the City needs to include the rail corridors and at-grade rail crossings in their traffic analysis when processing entitlement applications for projects. The commission is interested in how this project's environmental effects for direct and cumulative traffic/circulation impacts will have on at-grade rail crossings in the City.

According to the project description as part of the improvements to the downtown, a Main Street Realignment would be constructed to help reduce through traffic and create additional street frontage to accommodate downtown business and pedestrian traffic. Implementation of the Specific Plan could result in development of up to 300 dwelling units and 360,000 square feet of commercial space.

We request that the City have the traffic consultant include the at-grade rail crossings in the traffic impact study with the project assumptions in the NOP for all traffic modeling scenarios.

The City of Oakley shonld consider an update to their City wide traffic impact fee program to include at grade rail crossings safety improvements for project specific/cumulative traffic impacts. If the rail crossings are currently included, please forward for our review.

Please send the traffic impact study scope when available for further review and how the City will be addressing the at-grade rail crossings in the Transportation/Traffic Circulation section of the DEIR.

The CPUC requests that all future proposed land use entitlements be forwarded to us for review and comment for specific project and cumulative impacts to the rail crossings.

Thank you for your consideration of these comments. We look forward to working with the City on the review of this project. If you have any questions in this matter, please call me at (415) 713-0092 or email me at ms2@cpuc.ca.gov.

Sincerely,

Moses Stites

Moses Stites
Rail Corridor Safety Specialist
Public Utilities Commission
Consumer Protection and Safety Division
Rail Transit and Crossings Branch
515 L Street, Suite 1119
Sacramento, CA 95814

DEPARTMENT OF TRANSPORTATION
111 GRAND AVENUE
P. O. BOX 23660
OAKLAND, CA 94623-0660
PHONE (510) 622-5491
FAX (510) 286-5559
TTY 711

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Community Development Dept
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PLANNING DIVISION
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fax 12/22/08

December 22, 2008

CCGEN013
SCH#2008112089

Mr. Ken Strelo
City of Oakley
3231 Main Street
Oakley, CA 94561

Dear Mr. Strelo:

Oakley Downtown Specific Plan (DTSP) – Notice of Preparation

Thank you for including the California Department of Transportation (Department) in the early stages of the environmental review process for the DTSP project. The following comments are based on the Notice of Preparation (NOP). As the lead agency, the City of Oakley is responsible for all project mitigation, including any needed improvements to State highways. The project's fair share contribution, financing, scheduling, implementation responsibilities and lead agency monitoring should be fully discussed for all proposed mitigation measures. This information should also be presented in the Mitigation Monitoring and Reporting Plan of the environmental document. Required roadway improvements should be completed prior to issuance of the Certificate of Occupancy. Although the Department is in the process of transferring a portion of State Route (SR) 4 to SR 4 bypass and the portion of SR 4 within the limits of this specific plan is part of the transfer, the proposed improvements, depending on the timing, may subject to the Department 's review and an encroachment permit may still be required. The Department will not issue a permit until our concerns are adequately addressed. We strongly recommend that the City of Oakley work with both the applicant and the Department to ensure that our concerns are resolved during the CEQA process, and, in any case, prior to submittal of a permit application. Further comments will be provided during the encroachment permit process; see the end of this letter for more information regarding encroachment permits.

Traffic Impact Study (TIS)
Please include the information detailed below in the TIS to ensure that project-related impacts to State roadway facilities are thoroughly assessed. We encourage the City to coordinate preparation of the study with our office, and we would appreciate the opportunity to review the scope of work. The Department's *"Guide for the Preparation of Traffic Impact Studies"* should be reviewed prior to initiating any traffic analysis for the project; it is available at the following website: http://www.dot.ca.gov/hq/traffops/developserv/operationalsystems/reports/tisguide.pdf

The Traffic Study should include:

1. Vicinity map, regional location map, and a site plan clearly showing project access in relation to nearby State roadways. Ingress and egress for all project components should be clearly identified. State ROW should be clearly identified.

2. The maps should also include project driveways, local roads and intersections, parking, and transit facilities.

3. Project-related trip generation, distribution, and assignment. The assumptions and methodologies used to develop this information should be detailed in the study, and should be supported with appropriate documentation.

4. Average Daily Traffic, AM and PM peak hour volumes and levels of service (LOS) on all significantly affected roadways, including crossroads and controlled intersections for existing, existing plus project, cumulative and cumulative plus project scenarios. Calculation of cumulative traffic volumes should consider all traffic-generating developments, both existing and future, that would affect study area roadways and intersections. *The analysis should clearly identify the project's contribution to area traffic and degradation to existing and cumulative levels of service. Lastly, the Department's LOS threshold, which is the transition between LOS C and D, and is explained in detail in the Guide for Traffic Studies, should be applied to all State facilities.*

5. Schematic illustration of traffic conditions including the project site and study area roadways, trip distribution percentages and volumes as well as intersection geometrics, i.e., lane configurations, for the scenarios described above.

6. The project's consistency with both the Circulation Element of the General Plan and the Contra Costa County Congestion Management Agency's Congestion Management Plan should be evaluated.

7. Mitigation should be identified for any roadway mainline section or intersection with insufficient capacity to maintain an acceptable LOS with the addition of project-related and/or cumulative traffic.

8. Special attention should be given to the following trip-reducing measures:
   - Encouraging mixed-use,
   - Maximizing density through offering bonuses and/or credits,
   - Coordinating with AC transit, to increase transit use by expanding routes and emphasizing express service to regional rail stations, and by providing bus shelters with seating at any future bus pullouts,
   - Providing transit information to all future project employees and patrons, and
   - Encouraging bicycle- and pedestrian-friendly design.

Please forward a hard copy and one CD of the environmental document, along with the Traffic Study, including Technical Appendices, and staff report to the address below as soon as they are available.

Luis Melendez, Associate Transportation Planner
Community Planning Office, Mail Station 10D
California DOT, District 4
P.O. Box 23660
Oakland, CA 94623-0660

Community Planning
The Department encourages you to locate any needed housing, jobs and neighborhood services near major mass transit nodes, and connect these nodes with streets configured to encourage walking and bicycling, as a means of reducing regional vehicle miles traveled and traffic impacts on the State highways. We also recommend modeling pedestrian, bicycle, and transit trips in order that project generated impacts can be quantified. Mitigation measures resulting from this analysis should improve pedestrian and bicycle access to transit, thereby reducing traffic impacts on state highways.

Additionally, please provide a discussion and analysis on the secondary impacts to pedestrians and bicyclists that may result from traffic impact mitigation measures. Describe any pedestrian and bicycle mitigation measures that would be needed to maintain and improve access to transit and reduce traffic impacts on the State highway system.

Traffic Impact Fees
Please identify traffic impact fees. Development plans should require traffic impact fees based on projected traffic and/or based on associated cost estimates for public transportation facilities necessitated by development. Please refer to the California Office of Planning and Research (OPR) *2003 General Plan Guidelines,* page 163, which can be accessed on-line at the following website: http://www.opr.ca.gov/index.php?a=planning/gpg.html

Scheduling and costs associated with planned improvements on Departmental ROW should be listed, in addition to identifying viable funding sources correlated to the pace of improvements for roadway improvements, if any. Please refer to the state OPR's *2003 General Plan Guidelines,* page 106.

Encroachment Permit
Please be advised that any work or traffic control that encroaches onto the state ROW requires an encroachment permit that is issued by the Department. To apply, a completed encroachment permit application, environmental documentation, and five (5) sets of plans clearly indicating state ROW must be submitted to the address below. Traffic-related mitigation measures should be incorporated into the construction plans during the encroachment permit process. See the website link below for more information. http://www.dot.ca.gov/hq/traffops/developserv/permits/

Michael Condie, District Office Chief
Office of Permits
California DOT, District 4
P.O. Box 23660
Oakland, CA 94623-0660

Please feel free to call or email Luis Melendez of my staff at (510) 286-5606 or Luis_Melendez@dot.ca.gov with any questions regarding this letter.

Sincerely,

for LISA CARBONI
District Branch Chief
Local Development – Intergovernmental Review

c: State Clearinghouse

TRANSPLAN COMMITTEE
EAST COUNTY TRANSPORTATION PLANNING
Antioch • Brentwood • Oakley • Pittsburg • Contra Costa County
651 Pine Street -- North Wing 4TH Floor, Martinez, CA 94553-0095

December 30, 2008

Mr. Ken Strelo
Senior Planner
City of Oakley
Oakley, California 94561

Dear Mr. Strelo:

TRANSPLAN appreciates the opportunity to comment on the City of Oakley's Notice of Preparation of a Draft Environmental Impact Report (DEIR) for the Oakley Downtown Specific Plan.

The guiding policy document that TRANSPLAN uses in the review of the impact of projects is the *East County Action Plan For Routes of Regional Significance.* TRANSPLAN is currently transitioning from the June 2000 version[1] to an updated release planned for adoption in early 2009[2]. While the 2000 document is the adopted document, TRANSPLAN requests that the City review both documents in the development of the DEIR.

In addition to analyzing the impact of the project relative to the Traffic Service Objectives in the 2000 Action Plan and Multi-Modal Transportation Service Objectives in the 2009 version, the traffic analysis should be consistent with CCTA's *Technical Procedures Manual* (Update 2006).

Please work with the local transit district, Tri Delta Transit, to either construct or plan for/accommodate the future construction of site improvements necessary for public transit service.

Thank you for the opportunity to comment. Please let me know if you have any questions on this letter.

Sincerely,

John Cunningham
TRANSPLAN staff

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c: TRANSPLAN Technical Advisory Committee

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[1] Available here:
http://www.transplan.us/docs/EastActPlan.pdf

[2] Draft available here:
http://www.ccta.net/assets/documents/Action~Plan/EAST-COUNTY-ACTION-PLAN2.pdf

Phone: 925.335.1243 Fax: 925.335.1300 jcunn@cd.cccounty.us www.transplan.us

OAKLEY DOWNTOWN SPECIFIC PLAN
INITIAL STUDY/CEQA
ENVIRONMENTAL CHECKLIST

LSA

September 2009

OAKLEY DOWNTOWN SPECIFIC PLAN
INITIAL STUDY/CEQA
ENVIRONMENTAL CHECKLIST

Submitted to:

City of Oakley
3231 Main Street
Oakley, CA 94561

Prepared by:

LSA Associates, Inc.
2215 Fifth Street
Berkeley, CA 94710

LSA

September 2009

TABLE OF CONTENTS

FIGURES

TABLES

A. SUMMARY INFORMATION

The following provides a brief description of the proposed project, the location and setting of the proposed project, and contact information.

1. Project Title:

Oakley Downtown Specific Plan (DTSP)

2. Lead Agency Name and Address:

City of Oakley
3231 Main Street
Oakley, CA 94561

3. Contact Person and Phone Number:

Rebecca Willis, Community Development Director
Phone Number: (925) 625-7006

4. Project Location:

The DTSP encompasses an approximately 80-acre area (referred to in this document as either the "DTSP area" or "DTSP site") within Downtown Oakley and is generally located along both sides of Highway 4/Main Street, between Miguel Drive to the west and the Contra Costa Canal to the east. The Burlington Northern Santa Fe (BNSF) Railroad line forms the northern border of the DTSP area and Home Street forms the southern boundary. The Main Street frontage, which is approximately 4,800 linear feet in length within the DTSP area, serves as the focus of the DTSP.

5. Project Sponsor's Name and Address:

City of Oakley
Redevelopment Agency
3231 Main Street
Oakley, CA 94561

6. General Plan Designation:

Commercial Downtown
Single Family Residential-High Density
Multiple Residential-Low Density
Public and Semi-Public

7. Zoning:

Mixed Use Area (MU)
Commercial (CO)
Multiple Family Residential-Low Density (ML)
Single Family Residential-High Density (SH)
Public/Semi-Public (PS)
Light Industrial (LI)

8. Description of Project:

The DTSP would implement the Oakley 2020 General Plan policies for the Downtown through programs and capital improvement projects that the City will pursue in coming years to realize the community's Downtown vision. This Initial Study for the DTSP relies upon the program level analysis provided in the General Plan Environmental Impact Report (EIR) as well as specific studies prepared for the DTSP area.

Approximately 40 percent of the properties in the Downtown core are vacant. The DTSP provides strategies to redevelop the area with commercial and residential uses, to enhance existing developed areas with streetscape improvements and to renovate existing buildings. As part of the improvements to the Downtown area, a Main Street Realignment would be constructed, which would reduce through automobile and truck traffic on Main Street and would create an additional street frontage to accommodate downtown businesses. The roadway realignment would require removal of approximately 13 existing buildings.

The DTSP's land use and revitalization strategy envisions the redevelopment of eight key Redevelopment Opportunity Sites on vacant or underutilized parcels in the Downtown. Continuous storefronts along Main Street and large footprint commercial development along the Main Street Realignment could create up to 360,000 square feet of commercial space. Infill housing on the upper floors and adjacent frontages could provide up to 300 dwelling units.

9. Surrounding Land Uses and Setting:

The DTSP area is generally bounded by residential development to the north, south and west, and residential and open land to the east.

B. PLAN DESCRIPTION

This project description provides an overview of Downtown Oakley's regional and local context, its planning and regulatory setting, and a general description of the Downtown Specific Plan (DTSP).

1. Location

The City of Oakley is located in eastern Contra Costa County. Oakley is bordered to the north by the San Joaquin River, to the west by the City of Antioch, to south by the City of Brentwood, and to the east by unincorporated Contra Costa County. Figure 1 shows the project vicinity and regional location.

The DTSP area (or "project area") is generally located along both sides of Main Street, between Miguel Drive to the west and the Contra Costa Canal to the east. The BNSF Railroad line forms the northern border of the Plan area and Home Street is the southern boundary.

2. General Characteristics

The project area totals approximately 80 acres. There is a broad range of development within the DTSP area including: older storefront commercial buildings; small-scale highway commercial

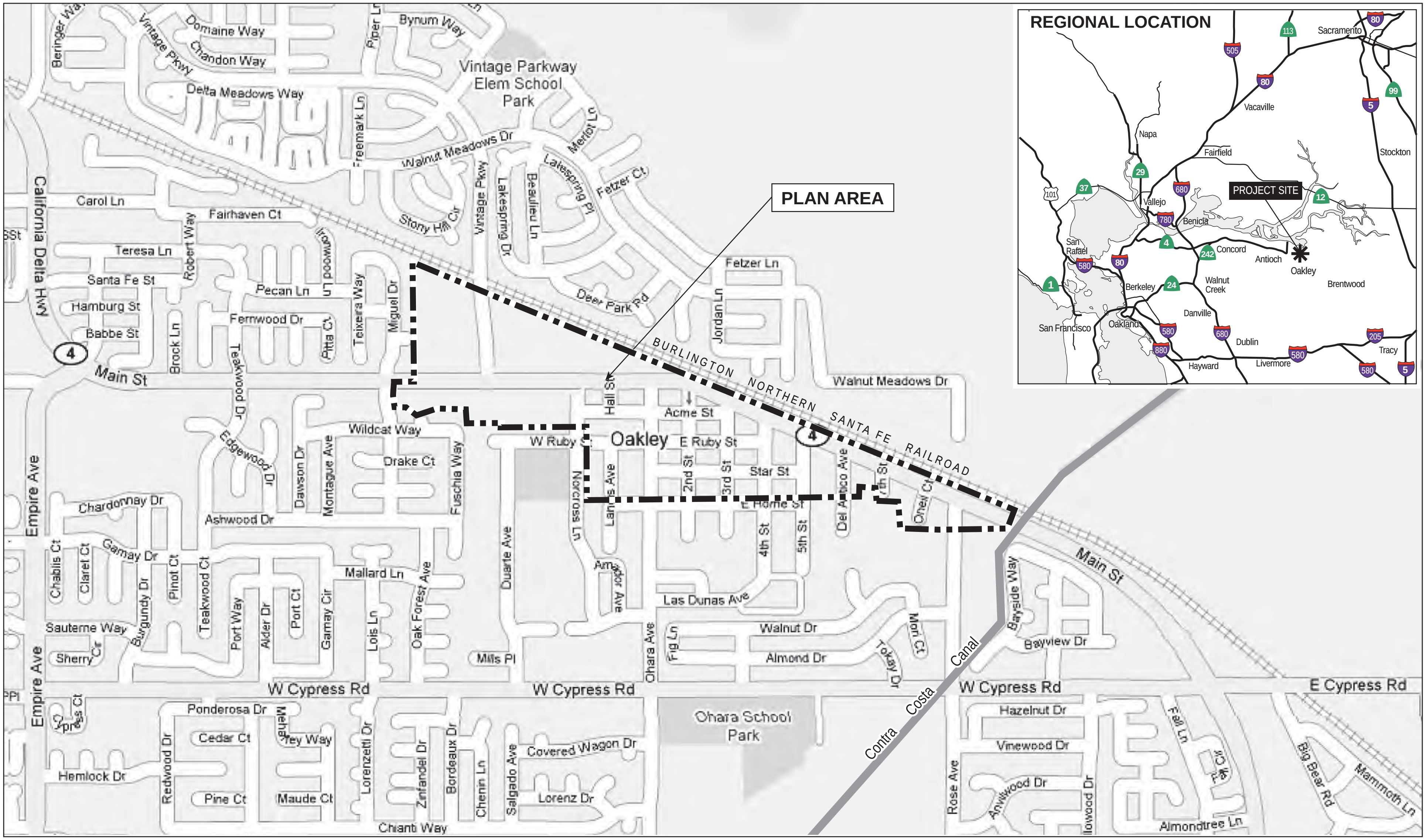

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FIGURE 1

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LEGEND

PLAN AREA

Oakley Downtown Specific Plan Initial Study

Project Vicinity and Regional Location

SOURCE: GOOGLE MAPS, 2006.

I:\OKY0601 oakley\figures\Fig_1.ai (9/5/08) development; light-industrial; auto-related development; and residential uses. Figure 2 provides an aerial view of the project area and its surroundings.

The Highway 4/Main Street frontage, which is approximately 4,800 linear feet in length within the project area, serves as the focus of the DTSP. There is little continuity in the current development pattern and many areas of Downtown lack basic streetscape infrastructure, including curbs, sidewalks, and gutters. Many of the existing buildings in the DTSP area need maintenance or major renovations.

Vacant lots make up nearly 40 percent, or approximately 30 acres, of the site. The DTSP identifies these areas as “opportunity sites” for new development.

3. Planning and Regulatory Context

Prior to the City’s incorporation in July 1999, Contra Costa County adopted plans and policies to guide development of Oakley’s Downtown, including the Redevelopment Plan for Oakley (1989), the Old Town Oakley Specific Plan (1996) and the Oakley Redevelopment Area Planned Unit District (1999). After the City was incorporated, it adopted the Oakley 2020 General Plan (2002), which incorporates the prior planning concepts and contains a number of policies focused on Downtown improvement and revitalization.

An update to the Old Town Oakley Specific Plan, the Downtown Design & Development Plan, was drafted under the direction of the Oakley Downtown Task Force in 2005. Although the Downtown Design & Development Plan was never adopted, it served as the basis for the majority of the policies and regulations contained in the DTSP, which is analyzed in this Initial Study.

4. Downtown Specific Plan Overview

The DTSP would implement the Oakley 2020 General Plan policies for Downtown and compiles the Downtown Revitalization Strategy recommendations, clarifies revitalization objectives, and defines the programs and capital improvements that the City and the Redevelopment Agency will pursue in coming years to realize the community’s Downtown vision.

A major element of the DTSP is the construction of a bypass around a portion of Highway 4/Main Street (Main Street Realignment), as well as improvements to the existing Main Street to make it more pedestrian friendly. The Main Street Realignment is intended to reduce through automobile and truck traffic along Main Street, allowing the street to function as a more pedestrian-oriented commercial area. It would also create additional street frontage to accommodate businesses oriented to through-traffic.

The DTSP anticipates redevelopment of existing properties and new development on vacant sites that would contribute to the critical mass of destinations needed to draw residents and visitors to the downtown. Continuous store fronts along Main Street and large footprint commercial development along the Main Street Realignment could create up to 360,000 square feet of commercial space. Infill housing on the upper floors and adjacent frontages could provide up to 300 dwelling units.

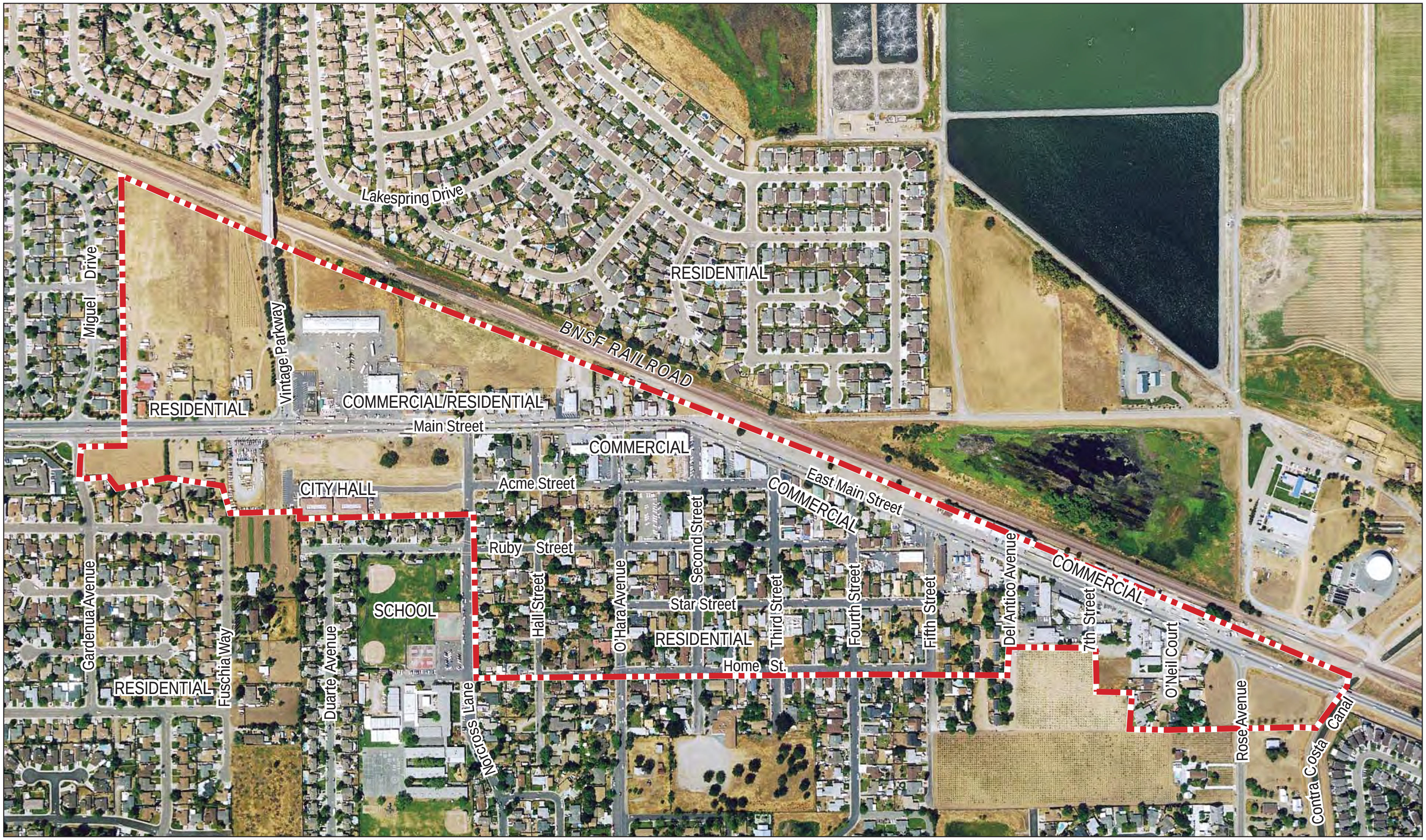

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FIGURE 2

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PLAN AREA

Oakley Downtown Specific Plan Initial Study

Existing Land Uses

SOURCE: GLOBEXPLORER, MAY 2006.

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a. Downtown Specific Plan Organization. The DTSP is divided into six chapters. The contents of these chapters are briefly described below.

- ***Chapter I – Plan Background & Objectives.*** Summarizes the community's Downtown vision, planning context, existing conditions, the planning process, revitalization goals and project summary.
- ***Chapter II – Land Use & Revitalization Strategy.*** Describes the planned pattern of land use and development of opportunity sites as well as the challenges and opportunities for promoting significant new private sector investment in the downtown.
- ***Chapter III – Capital Improvements.*** Describes the physical improvements recommended for Downtown streets and buildings.
- ***Chapter IV – Infrastructure & Public Services.*** Describes the existing and proposed public services and utilities serving the DTSP area.
- ***Chapter V – Implementation.*** Lists proposed projects, costs, potential funding sources, and describes the administrative application of the DTSP.
- ***Chapter VI – Design & Development Guidelines.*** Provides detailed policies for land use, building form, and site improvements that will be applied as part of the City's development application and review process.

b. Downtown Specific Plan Goals and Objectives. The DTSP identifies four revitalization goals and five revitalization objectives.

Revitalization Goals

- ***Improve Main Street's Overall Appearance.*** Improving the appearance of Main Street is essential for attracting the patrons and new investment needed to create a vibrant downtown.
- ***Enhance the Pedestrian Environment.*** To support a pedestrian-oriented district, visible cro-sswalks, corner bulbouts, street furnishings, and sidewalk-directed lighting should be installed throughout Downtown.
- ***Facilitate the Main Street Realignment.*** The Main Street Realignment will be a catalyst for investment, giving new life to Main Street by redirecting heavy truck and through traffic around the core Downtown, and creating newly accessible properties that enhance Downtown's ability to attract new development.
- ***Promote Higher Density Infill Development.*** Increased density will support Downtown's businesses and capitalize on a pedestrian-oriented environment.

Revitalization Objectives

- Implement a Main Street Improvement Project to enhance Downtown's image and its ability to attract new businesses. This project would include new curbs, sidewalks, street trees, streetlights, and other basic amenities along Main Street.
- Promote property renovation and redevelopment through a Facade Improvement Program that injects life into existing properties.

- Obtain funding and implement the Main Street Realignment.
- Focus pedestrian oriented development Downtown through revitalizing existing uses and encouraging higher density residential development and supporting commercial services.
- Concentrate storefront development within the Downtown Core to create a pedestrian-oriented commercial district, with contiguous storefront buildings concentrated within a walkable area.

5. Downtown Specific Plan Development Regulations

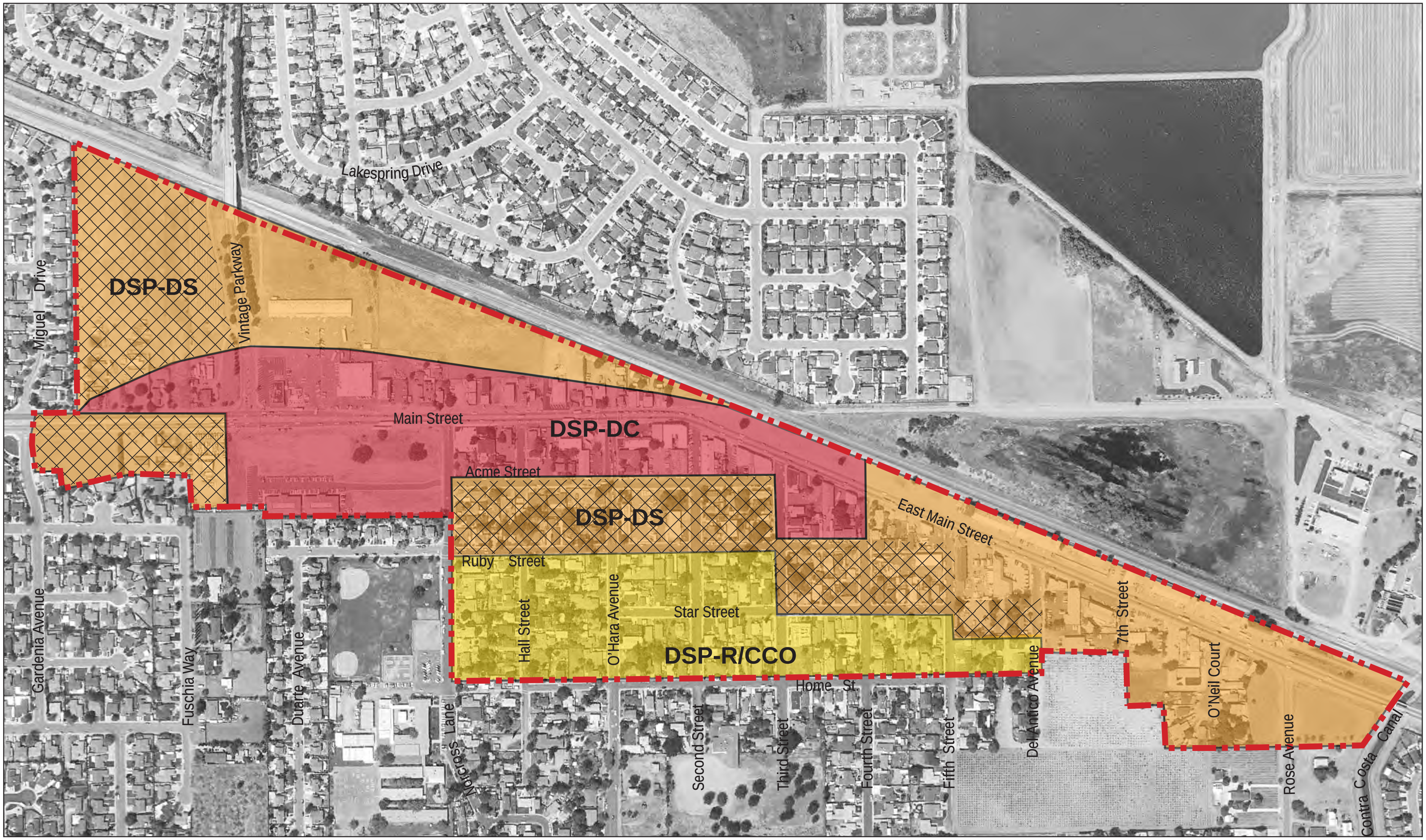
Development standards and design guidelines are proposed as part of the DTSP as described below.

a. Development Standards. As shown in Figure 3, the DTSP area is divided into three land use subareas with development standards that apply to each subarea.

- **Downtown Core Area (DC).** This subarea would have multi-story buildings with active first-floor retail, restaurant, and related uses, consistent with the Commercial Downtown General Plan designation for the area. Upper floors may be commercial and/or residential uses. Buildings would be a maximum of four-stories and/or 50 feet in height. The maximum floor area ratio (FAR) would be 1.0.
- **Downtown Support Area (DS).** This subarea would have a mix of commercial, office, and infill residential uses to support the Downtown Core. Maximum building height and FAR would be the same as for the Downtown Core, with certain exceptions, and would be consistent with the General Plan designation of Commercial Downtown for the majority of the subarea.
- **Residential/Commercial Conversion Opportunity Area (R/CCO).** This subarea would remain primarily residential, with a mix of some office and commercial business in renovated buildings. The existing development character of the area would be preserved with emphasis on renovation of existing buildings. The existing zoning for the subarea is primarily Single-Family Residential-High Density (SH), with the southeast portion of the subarea currently zoned Commercial (CO). Existing development regulations, including building heights and setbacks would apply.

b. Guidelines. The DTSP provides four categories of guidelines as described below.

- **Building Design Guidelines.** These guidelines address the design of overall building massing, building facades, roofs and other major components.
- **Parking Standards and Guidelines.** These guidelines provide parking requirements and design recommendations for the DTSP site.
- **Site Improvements and Landscaping Guidelines.** These guidelines address the public streetscape as well as private properties, with specific recommendations for paving materials, walls, fences and piers, fountains, plant materials, and surface grading.
- **Sign Guidelines.** Sign guidelines address sign types, proportion, building compatibility, mounting and placement, materials, and maintenance.



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DOWNTOWN SPECIFIC PLAN – DOWNTOWN CORE (DC) AREA

DOWNTOWN SPECIFIC PLAN – DOWNTOWN SUPPORT (DS) AREA

DOWNTOWN SPECIFIC PLAN – RESIDENTIAL/COMMERCIAL CONVERSION OPPORTUNITY (R/CCO) AREA

AREA RECOMMENDED FOR RESIDENTIAL INFILL

PLAN AREA BOUNDARY

FIGURE 3

Oakley Downtown Specific Plan Initial Study

Downtown Specific Plan Subareas and Proposed Zoning

SOURCE: GLOBEXPLORER, MAY 2006; BOTTOMLEY ASSOCIATES, 2009.

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6. Downtown Specific Plan Implementation

The DTSP identifies revitalization strategies that would contribute to creating a vibrant Downtown. This section describes the projects envisioned by the DTSP and the City actions required to implement the plan.

a. Redevelopment Opportunity Sites. Many Downtown properties are underutilized or vacant, and the proposed Main Street Realignment would reconfigure properties and require removal of a number of existing buildings. These conditions offer opportunities to pursue Downtown revitalization objectives and redevelop key opportunity sites. The DTSP contains recommendations for development of sites that exist today (near-term) or will be created by the Main Street Realignment (long-term). Figure 4 shows the location of these redevelopment opportunity sites. Policy recommendations for the opportunity sites are summarized below. Table 1 lists the acreage and existing and proposed uses for each opportunity site.

Table 1: Redevelopment Opportunity Sites

Site	Acreage	Current Use	Proposed Use
Near-Term Opportunity Sites			
1. City Hall/ Civic Center	6.9	City Hall, park and restaurant	Additional governmental/quasi-governmental uses
2. Centro Mart Frontage	2.2	Grocery store, surface parking, 2 restaurants	Ground floor commercial (possibly grocery) and second floor residential/office
3. East Main Street	4.0	Commercial uses; vacant; property owned by BNSF railroad	Commercial development
7/8. Infill Sites	--	Commercial and residential uses	Storefront commercial district
Long-Term Opportunity Sites			
4. Oakley Plaza	3.6	Existing strip commercial, parking and vacant land	"Medium box" commercial
5. Main Street Triangle	1.4	Residential uses; site will be created by the Realignment	Gateway feature and commercial development
6. Vintage Parkway Site	10.7	Primarily vacant; some residential uses	Commercial and/or residential

Source: Oakley, City of and Bottomley Associates Urban Design and Planning, 2009. *City of Oakley Downtown Specific Plan*, June.

Near-Term Opportunity Sites

- *City Hall Site (Site 1)*: The City Hall Site is located along the southern frontage of Main Street between Fuschia Way and Norcross Lane. This site serves as an anchor for Downtown and includes the City Hall (completed in 2007), plaza/park, and a restaurant (Black Bear Diner).[1] The commercial frontage on the eastern portion of the site remains to be completed with governmental/quasi-governmental uses.

[1] Environmental review for the project was completed by the City in the *Initial Study for the Oakley Civic Center*, July 15, 2003.

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NEAR TERM OPPORTUNITY SITES
1 – CITY HALL SITE
2 – CENTRO MART SITE & FRONTAGE
3 – EAST MAIN STREET

LONG TERM OPPORTUNITY SITES
4 – OAKLEY PLAZA SITE
5 – MAIN STREET TRIANGLE
6 – VINTAGE PARKWAY SITE

INFILL DEVELOPMENT SITES
7 – SOUTH SIDE – GARDENIA TO FIFTH
8 – NORTH SIDE – NORCROSS TO O'HARA

POTENTIAL RESIDENTIAL/COMMERCIAL AREA

PLAN AREA BOUNDARY

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FIGURE 4

Oakley Downtown Specific Plan EIR

Redevelopment Opportunity Sites

SOURCE: GLOBEXPLORER, MAY 2006; BOTTOMLEY ASSOCIATES, 2009.

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- *Centro Mart Frontage (Site 2):* Centro Mart Frontage is located along the northern frontage of Main Street between Vintage Parkway and Norcross Lane, across Main Street from City Hall.

  Centro Mart grocery store, two restaurants and surface parking are currently located on the site. The DTSP envisions redevelopment of this site with storefront commercial space, including a new or renovated Centro Mart and possibly second floor residential or office space.

- *East Main Street (Site 3):* This site is located along the northeastern frontage of E. Main Street from Second Street to the Contra Costa Canal. The site currently consists of commercial uses and vacant parcels. A portion of the site is owned by the BNSF Railroad Company. The DTSP would promote development of vacant properties and redevelopment of existing ones to improve the appearance of the frontage and support the City's tax base.

- *Infill Development Sites (Sites 7 and 8)*: Infill sites along both sides of Main Street are identified for significant renovation and/or redevelopment to create a storefront commercial district. Existing uses include small commercial and residential buildings. Sites to the south of Main Street generally span from Gardenia Avenue on the west to the Contra Costa Canal on the east. Infill sites north of Main Street span from Norcross Lane to O'Hara Avenue. The DTSP establishes policies for the City and Redevelopment Agency to assist with assembly and redevelopment of these properties and envisions improvements to the street frontage.

Long-Term Opportunity Sites

- *Oakley Plaza (Site 4):* Oakley Plaza is located along the northern frontage of the proposed Realignment between Vintage Parkway and the BNSF railroad tracks. Commercial uses, parking and vacant parcels currently occupy the site. The DTSP encourages development of new medium-box, non-storefront commercial uses (automobile-oriented) along the Realignment.

- *Main Street Triangle (Site 5):* The Main Street Triangle would be created by the Realignment at the western entrance to the Downtown, north of the existing Main Street and south of the proposed Realignment. Residential uses are currently located on the site. The DTSP envisions development of a "gateway" storefront commercial building, with a landmark sign or fountain.

- *Vintage Parkway Site (Site 6):* The Vintage Parkway site is located north of Main Street and the proposed Realignment, between Miguel Drive and Vintage Parkway. A few residential buildings occupy the site, which is primarily vacant. The DTSP would encourage development of Downtown-supportive commercial or residential development on the site.

b. City Implementation. Implementation of the DTSP requires regulatory and policy actions as well as planning and funding of capital improvements. Capital improvements proposed under the DTSP include construction of roadways, streetscape and infrastructure improvements, and establishing public/private-financing mechanisms.

- **Interim Revitalization Efforts.** Interim efforts, which the City can pursue prior to construction of the Main Street Realignment, include policy actions and funding of Downtown streetscape and building improvements, including promotion of parcel assembly.

- **Long-term Capital Improvements.** The Main Street Realignment is the primary capital improvement called for by the DTSP. The Realignment would consist of an approximately ½-mile new four-lane northerly bypass of Main Street, from just east of Gardenia Avenue to just west of

Second Street. The Realignment would carry commuter and through-traffic, while allowing the existing Main Street to be narrowed and become a pedestrian and business-friendly commercial street for Downtown Oakley destinations. Additional capital improvements would include widening of Main Street, installation of landscaping, pedestrian amenities and signage along streets in the Downtown, construction of additional parking, creation of Downtown gateways, and utility upgrades including a new sanitary sewer system north of Main Street, and placement of overhead electrical and telephone lines underground.

6. Required City Approvals

The City of Oakley would take the following discretionary actions in order to implement the DTSP, which require review by the Planning Commission and approval by the City Council:

- Text and Map amendments to the Oakley 2020 General Plan to ensure consistency between the General Plan and DTSP for the land use mix, density, and other Downtown characteristics;
- Zoning Ordinance amendment to create the Downtown Specific Plan (DSP) District;
- Rezoning the DTSP area to the DSP District;
- Zoning Ordinance amendments for the Oakley Redevelopment Area Planned Unit District (RDA PUD) for consistency with the land uses and design guidelines specified by the DTSP;
- Certification of the DTSP EIR; and
- Approval of the DTSP.

In addition, subsequent discretionary actions by the City would be required for the implementation of the capital improvements projects envisioned by the DTSP, including the Main Street Improvements and the Main Street Realignment, as well as for individual development projects proposed under the DTSP.

C. 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. As such, an Environmental Impact Report (EIR) will be prepared to evaluate these potential impacts.

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

Determination. (To be completed by the Lead Agency.)

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 pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Kenneth Strelo	August 26, 2009
Signature	Date
Ken Strelo	City of Oakley
Printed Name	For

D. ENVIRONMENTAL CHECKLIST

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
I. AESTHETICS. Would the project:				
a) Have a substantial adverse effect on a scenic vista?	❐	❐	■	❐
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway?	❐	❐	■	❐
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	❐	❐	■	❐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	❐	■	❐	❐

a) Have a substantial adverse effect on a scenic vista? ***(Less-Than-Significant Impact)***

The City of Oakley's 2020 General Plan designates several natural landscape features as scenic resources, including waterways of the Delta, Dutch Slough, Marsh Creek, Contra Costa Canal, habitat areas and open space land. Views of Mount Diablo to the west of the City and views of the Delta to the north are designated as scenic vistas. Mount Diablo is visible from many areas of the City, including Downtown, particularly on streets running east to west.

The Plan area is generally divided into a Downtown Core Area and a Downtown Support Area. Development in the Downtown Core Area would have first floor retail along Main Street with mixed uses permitted, such as residential above retail. Buildings could be a maximum of four floors and/or 50 feet in height and would have parking requirements and minimal setbacks. Development in the Downtown Support Area would be mixed commercial/service with areas for higher density residential. Buildings could also be a maximum of four floors and/or 50 feet in height and would step-down to adjacent single family residential uses.

Views of the Delta are not available from within the Plan area. Views of Mount Diablo exist from various locations throughout the Plan area. Development of the vacant parcels and redevelopment of existing single-story commercial buildings with multi-story buildings would reduce existing views of Mount Diablo, particularly views from the residential area north of the BNSF Railroad. However, this reduction in views would be intermittent depending on the final building development within the Downtown. Views of Mount Diablo would not be significantly diminished along streets running east to west. Therefore, due to the small extent to which implementation of the DTSP would reduce scenic vistas, this change would not constitute a significant adverse effect.

b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway? ***(Less-Than-Significant Impact)***

The only officially designated State scenic highways within Contra Costa County are portions of Highway 24 and Interstate 680.[2] These scenic highways are not within the vicinity of the Downtown Plan area.

Portions of State Route 160 and State Route 4 located in Downtown Oakley are eligible for State scenic highway designation.[3] While implementation of the Downtown Plan would not result in the removal of a substantial number of trees or rock outcroppings, it could result in the removal of structures that contribute to a historic district. However, this portion of Highway 4 is not designated as a State scenic highway and the potential impact would be less than significant. Refer to Section V, Cultural Resources, for a detailed discussion of historic buildings.

c) Substantially degrade the existing visual character or quality of the site and its surroundings? ***(Less-Than-Significant Impact)***

The DTSP area is characterized by highway-oriented commercial development with little continuity between buildings and street frontages. Several highly-visible vacant properties are located in the DTSP area and comprise approximately 40 percent of the site. In addition, buildings in need of façade repairs and segments of the Main Street frontage without curbs, sidewalks, or streetscape amenities typify the visual character of the DTSP site.

Implementation of the DTSP could change the visual character of the area and would include new construction, facade improvements to existing structures, and streetscape improvements including installation of sidewalks, street lights, curb and gutters, and new street signs. These changes would improve the visual character of the Downtown and surrounding area and would result in a less-than-significant impact.

d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area? ***(Potentially Significant Unless Mitigation Incorporated)***

Lighting would be installed as part of the street improvements and on parcels where development/ redevelopment and façade improvements occur. Installation of lighting throughout the Downtown Plan area could cumulatively create light or glare affecting day or nighttime views.

Implementation of the following mitigation measure would reduce this impact to a less-than-significant level:

> <u>Mitigation Measure AES-1</u>: For each project developed under the DTSP, the Community Development Department shall review lighting plans to ensure that lighting is low-intensity and downward-directed and does not create a substantial source of light or glare.

[2] California Department of Transportation, 2009. California Scenic Highway Program. Website: www.dot.ca.gov/hq/LandArch/scenic/schwy1.html.

[3] California Department of Transportation, 2009. California Scenic Highway Program. Website: www.dot.ca.gov/hq/LandArch/scenic_highways/index.htm.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
II. 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 a non-agricultural use?	☐	☐	☐	■
b) Conflict with existing zoning for agricultural use, or a 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?	☐	☐	☐	■

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 a non-agricultural use? ***(No Impact)***

The DTSP area is located in the Downtown Core of Oakley and is surrounded by residential and commercial development. Vacant lots make up nearly 40 percent, or approximately 30 acres, of the approximately 80-acre DTSP site.

The DTSP site is designated as "Urban and Built-Up Land" by the State Department of Conservation.[4] A small area that borders the DTSP site to the south, between Del Antico Avenue and Rose Avenue, is designated as Unique Farmland. This isolated area is surrounded by urban development and is no longer used for farming. Implementation of the DTSP would not convert farmland designated by the Department of Conservation's Farmland Mapping and Monitoring Program to a non-agricultural use.

b) Conflict with existing zoning for agricultural use, or a Williamson Act contract? ***(No Impact)***

The City of Oakley's General Plan Vegetation Types map designates portions of the DTSP as agricultural/ruderal.[5] However, these areas are generally vacant fields and are not in agricultural use.

[4] California Department of Conservation, 2009. Contra Costa County Important Farmland Map 2008. Website: www.conservation.ca.gov/DLRP/fmmp/Pages/Index.aspx. June.

[5] Ruderal refers to a vegetation type dominated by non-native weedy plant species, which are typically present on highly disturbed land.

The DTSP does not include properties under Williamson Act contract and is not zoned for agricultural use. Therefore, the DTSP would not conflict with existing zoning for agricultural use or a 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? ***(No Impact)***

Implementation of the DTSP would not result in the extension of infrastructure into an undeveloped area or other physical changes that would result in the conversion of farmland to non-agricultural uses. The DTSP could increase housing and commercial space in an already-urbanized area, thus reducing development pressures on regional agricultural areas.

	Potentially Significant Impact	**Potentially Significant Unless Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
III. 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:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	■	❒	❒	❒
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	■	❒	❒	❒
c) Result in a cumulatively 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)?	■	❒	❒	❒
d) Expose sensitive receptors to substantial pollutant concentrations?	■	❒	❒	❒
e) Create objectionable odors affecting a substantial number of people?	■	❒	❒	❒

Implementation of the DTSP would result in temporary construction-related air quality impacts, as well as long-term air quality impacts related primarily to mobile source pollutants. The EIR will address air quality impacts from projects developed under the DTSP.

In addition, projects developed under the DTSP would emit greenhouse gases through a variety of activities associated with development, including vehicular trips and construction activities. The EIR will address the DTSP's contribution to Global Climate Change (GCC) as well as the potential impacts of GCC-related effects on projects developed under the DTSP.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
IV. 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) 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?	❒	■	❒	❒
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?	❒	❒	❒	■
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 wildlife nursery sites?	❒	❒	■	❒
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	❒	❒	■	❒
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?	❒	❒	❒	■

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?* ***(Potentially Significant Unless Mitigation Incorporated)***

The City of Oakley participates in the East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan (ECC HCP/NCCP). Pursuant to Section 10(a)(1)(B) of the Federal Endangered Species Act (ESA) incidental take of federally listed species is authorized under the conditions of the HCP. Additionally, take of covered species under Section 2835 of the California Natural Community Conservation Planning Act (NCCP) is authorized by the California Department of

Fish and Game (CDFG). The ECC HCP/NCCP designates the DTSP as urban/future urban land cover[6] and requires a Zone 1 development fee ($11,919 per acre).[7]

Due to the urban setting and past agricultural land uses within the DTSP site, it is unlikely that special status species, including those covered under the HCP, would occur within the DTSP site.[8] Wildlife species that do occupy the site are typically common species that easily adapt to disturbed, urban conditions.

However, there is a potential for burrowing owls and Swainson's hawks to use the vacant open areas within the DTSP area for nesting. Construction activities could result in adverse impacts to these species. Implementation of the following mitigation measure would reduce this potential impact to a less-than-significant level.

> Mitigation Measure BIO-1: Prior to site preparation activities on Redevelopment Opportunity Sites 4 and 6 and the open undeveloped area at the southeast corner of the DTSP area along Rose Avenue, Mitigation Measures identified in the East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan for the burrowing owl and Swainson's hawk, including planning surveys and, if required, preconstruction surveys followed by Avoidance and Minimization and Construction Monitoring, shall be implemented, as appropriate.

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?* ***(Potentially Significant Unless Mitigation Incorporated)***

No riparian habitat or wetlands are located within the DTSP site.[9] However, wetlands are located adjacent to the site, as designated by the ECC HCP/NCCP. As described in Section IV.a, above, the City of Oakley is located within the permit area for the ECC HCP/NCCP and development projects would be subject to permit provisions, which allow for incidental takings. Additionally, implementation of Mitigation Measures HYD-1, HYD-2a, and HYD-2b (refer to Section VIII, below) would reduce this potential impact to a less-than-significant level.

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?* ***(No Impact)***

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[6] Jones and Stokes, 2006. *Final East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan, Volume I*. October. Figure 3-3, Landcover in the Inventory Area.

[7] Jones and Stokes, 2006. *Final East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan, Volume I*. October. Figure 9-1, Development Fee Zones.

[8] The City of Oakley General Plan indicates that the DTSP area has a low/minimal biological sensitivity value and a low/minimal potential to support special-status species.

[9] Oakley, City of, 2002. *Oakley 2020 General Plan*. Figure 6-1, Vegetation Types.

Federally-protected wetlands, as defined by Section 404 of the Clean Water Act, are not located in the DTSP area. Therefore, implementation of the DTSP would not impact federally protected wetlands.

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 wildlife nursery sites? ***(Less-Than-Significant Impact)***

The DTSP site contains a mix of developed and vacant lots, both of which have been subject to human disturbance. Wildlife associated with the DTSP area is generally adapted to disturbed urban sites and would not be substantially affected by implementation of the DTSP. As described in Section IV.a, above, the DTSP site is located within the permit area for the ECC HCP/NCCP and development projects would be subject to permit provisions, which allow for incidental takings. Therefore, implementation of the DTSP would not substantially interfere with the movement of native or migratory wildlife species, or adversely impact resident or migratory wildlife corridors or native wildlife nursery sites.

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance? ***(Less-Than-Significant Impact)***

Implementation of the DTSP would not conflict with any local policies or ordinances protecting biological resources. Projects developed under the DTSP would comply with the City's Heritage Tree Preservation Ordinance, which prevents the removal of designated trees without a tree removal permit.

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? ***(No Impact)***

As described in Section IV.a, above, the DTSP site is within the permit area for the ECC HCP/NCCP. Development/redevelopment in the DTSP area would comply with the requirements of the ECC HCP/NCCP. Therefore, implementation of the DTSP would not conflict with an adopted Habitat Conservation Plan, Natural Community Conservation Plan or other approved local, regional, or State habitat conservation plan.

	Potentially Significant Impact	**Potentially Significant Unless Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
V. CULTURAL RESOURCES. Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?	■	❒	❒	❒
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	■	❒	❒	❒

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	❐	■	❐	❐
d) Disturb any human remains, including those interred outside of formal cemeteries?	■	❐	❐	❐

a) *Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?* **(*Potentially Significant Impact)***

The DTSP encompasses approximately 80 acres of the Downtown area, which was the core of Oakley at the time of its founding at the turn of the 19^{th} and 20^{th} centuries. Architectural resources that meet the definition of historical resources under CEQA (PRC §21084.1) have been identified in the Specific DTSP area. Removal or modification of architectural resources within the area could result in adverse impacts to cultural resources. Additionally, the DTSP site has the potential for unidentified historical archaeological deposits that may meet the CEQA definition of historical resources. Ground disturbing activities associated with implementation of the DTSP could result in impacts to archaeological deposits. The EIR will address each of the above-listed potential impacts of the DTSP on cultural resources.

b) *Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?* ***(Potentially Significant Impact)***

As discussed above, the Plan area has a low sensitivity for prehistoric archaeological deposits and a moderate-to-high sensitivity for historical archaeological deposits. Either type of deposit may qualify as a unique archaeological resource as defined in PRC §21083.2(g). The Downtown Plan would require ground disturbing activities for site preparation and subsurface utilities installation, which may result in impacts to archaeological deposits. Impacts to archaeological deposits in the Plan area that qualify as unique archaeological resources under CEQA may result in substantial adverse impacts to the resources' significance. This impact is considered potentially significant. Mitigation measures to reduce the impact level, if possible, will be discussed in the DTSP.

c) *Directly or indirectly destroy a unique paleontological resource or site or unique geologic* feature? ***(Potentially Significant Unless Mitigation Incorporated)***

The geology of the area consists of Holocene stream channel deposits to a considerable depth and has a low sensitivity for paleontological resources. While unlikely, construction activities, including demolition and grading, have the potential to uncover previously unrecorded paleontological resources. Implementation of the following mitigation measure would reduce potential impacts to paleontological resources to a less-than-significant level.

> Mitigation Measure PALEO-1: Should any paleontological resources be uncovered during grading, excavation, or construction activities associated with implementation of the DTSP,

these activities shall be diverted to a part of the of the site away from the find and a certified paleontologist shall be contacted by the contractor to: 1) ascertain the significance of the resource; 2) establish a protocol with the City to protect such a resources (including methods for documentation and preservation); 3) ascertain the presence of additional resources; and 4) provide additional monitoring of the site if the City deems it appropriate.

d) Disturb any human remains, including those interred outside of formal cemeteries? ***(Potentially Significant Impact)***

There are no recorded archaeological sites with the potential to contain human remains within the DTSP area. This does not, however, mean that there is no potential for such remains. Unidentified prehistoric archaeological sites could be present in the Downtown Plan area, and such sites could contain human burials. In addition, isolated historical burials could be present in the Plan area. The Plan will require ground disturbing activities for site preparation and subsurface utilities installation, which may result in the disturbance of human remains, including those interred outside of formal cemeteries. The EIR will address potential impacts to human remains.

VI. GEOLOGY AND SOILS. Would the project:	**Potentially Significant Impact**	**Potentially Significant Unless Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
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 delineated 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 Division of Mines and Geology Special Publication 42.	❐	❐	■	❐
ii) Strong seismic ground shaking?	❐	❐	■	❐
iii) Seismic-related ground failure, including liquefaction?	❐	■	❐	❐
iv) Landslides?	❐	❐	❐	■
b) Result in substantial soil erosion or the loss of topsoil?	❐	■	❐	❐
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?	❐	■	❐	❐

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	■	☐	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	■

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. ***(Less-Than-Significant Impact)***

The San Francisco Bay region is a seismically active region that is subject to large earthquakes; there are 30 known faults in the Bay Area that are considered capable of generating earthquakes. The San Andreas Fault or the Antioch Fault could result in the maximum credible earthquake that may affect the City of Oakley within a 50-year time period.[10] Additionally, the Brentwood Fault, an inferred (approximately located) active fault, is the closest fault to the DTSP site and is located approximately 0.6 miles to the south. The Davis and Antioch inferred faults are located west of Oakley. The DTSP site is not located within an Alquist-Priolo zone. Since surface faulting or ground rupture tends to occur along previous fault lines, and identified fault lines are not located within or in the immediate vicinity of the site, implementation the DTSP would not adversely affect persons or structures due to the rupture of a known earthquake fault.

ii) Ground-shaking. ***(Less-Than-Significant Impact)***

Earthquakes on any of the faults within the Bay Area could cause strong ground shaking in the DTSP area depending upon the magnitude of the earthquake, the distance of the DTSP area from the earthquake epicenter, the type of geologic materials that underlie the DTSP area, as well as other factors. Because it affects a much broader area, ground shaking, rather than surface fault rupture, is the cause of most damage during earthquakes. The DTSP site is within an area of moderate damage susceptibility from seismic events.[11]

Structural damage to buildings results from the transmission of these vibrations through the ground. The Uniform Building Code (UBC) Chapter 16, Division IV, Earthquake Design, requires that structures be designed using certain earthquake design criteria. Development/redevelopment projects proposed under the DTSP would be designed in accordance with applicable building codes and would

[10] Oakley, City of, 2002. *Oakley 2020 General Plan, Chapter 8: Health and Safety*. Pg. 8-18.

[11] Oakley, City of, 2002. *Oakley 2020 General Plan, Chapter 8: Health and Safety*. Figure 8-1, Faults and Seismic Stability.

be required to complete a geotechnical report (per General Plan Policy 8.1.9), given that the area is within a high liquefaction potential area (see Mitigation Measure GEO-1, below).

iii) Ground Failure and Liquefaction. ***(Potentially Significant Unless Mitigation Incorporated)***

Soil liquefaction is a phenomenon primarily associated with saturated soil layers located close to the ground surface. Soils that are most susceptible to liquefaction are relatively loose, uniformly graded, cohesionless soils. These soils lose strength during ground shaking and become incapable of supporting overlying soils or structures. Due to the loss of strength, the soil acquires "mobility" sufficient to permit both horizontal and vertical movements. The underlying soils in the DTSP area have a generally high liquefaction potential. Development/redevelopment resulting from implementation of the DTSP may expose people or structures to potential substantial adverse risk of damage or injury. However, implementation of the following mitigation measure, as described in General Plan Policy 8.1.9, would reduce damage due to earthquake-induced liquefaction to a less-than-significant level.

> Mitigation Measure GEO-1: Prior to approval of new development projects or projects which substantially modify existing structures within the DTSP, a geologic and engineering study shall be completed to: 1) define and delineate potentially hazardous geologic and/or soils conditions; 2) recommend means of mitigating these adverse conditions; and 3) provide implementation of these recommendations. The study shall be consistent with the City of Oakley General Plan liquefaction policies (Policy 8.1.9).

iv) Landslides. ***(No Impact)***

The DTSP site is relatively flat, is not located in a hillside area, and is not susceptible to landslides.

b) Result in substantial soil erosion or the loss of topsoil? ***(Potentially Significant Unless Mitigation Incorporated)***

The potential for soil erosion exists during the period of earthwork activities and between the time when earthwork is completed and new vegetation is established or hardscape is installed. Previous uses in the DTSP area have disrupted the topsoil through building construction and laying of asphalt.

A Storm Water Pollution Prevention Plan (SWPPP) is a routine requirement of projects requiring grading permits. The SWPPP provides temporary measures to control sediment and other pollutants during construction. Implementation of Mitigation Measure HYD-1 (refer to Section VIII.a, below), which requires preparation and implementation of a SWPPP for projects disturbing 10,000 square feet or more, would reduce potential impacts associated with soil erosion to a less-than-significant level.

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? ***(Potentially Significant Unless Mitigation Incorporated)***

The DTSP is subject to liquefaction but is not prone to landslides. Implementation of Mitigation Measure GEO-1 would reduce potential impacts associated with ground instability to a less-than-significant level.

d) *Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?* ***(Potentially Significant Unless Mitigation Incorporated)***

Quaternary Alluvium, characterized by consolidated and unconsolidated sediment, comprises the majority of soils in the City of Oakley.[12] Expansive clay soils, which may underlay the DTSP site, could create substantial risks to life or property. Implementation of Mitigation Measure GEO-1, would reduce potential impacts associated with ground instability to a less-than-significant level.

e) *Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?* ***(No Impact)***

Sewer infrastructure is available in the DTSP and septic tanks or alternative waste water disposal systems would not be used.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
VII. 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) 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?	❒	■	❒	❒
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	❒	■	❒	❒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	❒	■	❒	❒

[12] Oakley, City of, 2002. *Oakley 2020 General Plan, Chapter 8: Health and Safety*. Pg. 8-16.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
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?	❒	❒	❒	■
f) For a project located within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	❒	❒	❒	■
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	❒	■	❒	❒
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?	❒	❒	■	❒

a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials? ***(Less-Than-Significant Impact)***

Implementation of the DTSP would result in the development of up to 360,000 square feet of commercial space and up to 300 dwelling units. Although small quantities of commercially-available hazardous materials could be used within the new residences or commercial space or for landscape maintenance within the DTSP site, these materials would not be used in sufficient quantities to pose a threat to human or environmental health. While gas and diesel fuel would typically be used by the construction vehicles, Best Management Practices (BMPs) would be utilized to ensure that no construction-related fuel hazards occur. Therefore, implementation of the DTSP would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.

As part of the building permit process, all plans are reviewed for compliance with applicable Building and Fire Department requirements, pursuant to the Uniform Building and Fire Codes, and all other related City requirements.

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? ***(Potentially Significant Unless Mitigation Incorporated)***

Based on a Phase 1 Environmental Site Assessment completed in 2005 for portions of the Downtown area, there are parcels within the within the DTSP site where hazardous materials had been used historically or are currently used.[13] Therefore, land disturbing activities associated with projects envisioned by the DTSP may result in accidental upset or release of hazardous materials. Implementation of the following three-part mitigation measure would reduce the impact of potential exposure to hazardous materials associated with past uses on individual sites to a less-than-significant level.

> Mitigation Measure HAZ-1a: As a condition of approval for any permit for demolition, excavation or grading of a parcel within the DTSP area, a Phase I site assessment shall be conducted by a qualified professional (e.g., a California-registered environmental assessor) to identify current or historical land uses that have or may have included the storage or generation of hazardous materials and the potential for releases of hazardous materials to have occurred that might impact the site. The assessments shall be performed in conformance with standards adopted by the American Society for Testing and Materials International in Method E1527-05 (ASTM Standard) for Phase I site assessments.

> Mitigation Measure HAZ-1b: If a Phase I site assessment indicates that a release of hazardous materials could have affected the site, additional soil and/or groundwater investigations shall be conducted by a qualified environmental professional to assess the presence and extent of contamination at the site. These investigations shall be conducted in conformance with State and local guidelines and regulations.

> Mitigation Measure HAZ-1c: For any site where contamination has been identified, construction shall only occur in accordance with a site-specific health and safety plan prepared by a certified industrial hygienist. The plan shall include provisions for monitoring exposure to construction workers, delineate procedures to be undertaken in the event that contamination is identified above action levels, and identify emergency procedures and responsible personnel. If construction were to take place on sites adjacent to residences or other areas with sensitive receptors, the health and safety plan shall include air monitoring at the perimeter of the construction site. The health and safety plan shall include performance standards identified to minimize the effects of airborne contaminants (for example, stopping work in dusty conditions, limiting excavation areas, or wetting down of surfaces). Construction workers at contaminated sites shall be required to have received hazardous materials training in accordance with Federal and State regulations.

Additionally, older buildings constructed prior to the 1980s may contain lead-based paint (LBP) and/or asbestos-containing materials (ACM). Demolition of these structures may have the potential to release lead particles and asbestos fibers into the air, where they could potentially pose a health risk to construction workers and the general public. Implementation of the following mitigation measure would reduce the potential impact of exposure to LBP and/or ACM to a less-than-significant level.

> Mitigation Measure HAZ-2: As a condition of approval for any demolition or permit for a structure known or suspected to have been constructed prior to 1980, an asbestos and lead-based paint survey shall be performed. If asbestos-containing materials are determined to be present, the materials shall be abated by a certified asbestos abatement contractor in accordance with the regulations and notification requirements of the Bay Area Air Quality Management District. If

[13] Malcolm Pirnie, 2005. City of Oakley Area-Wide Phase 1 Environmental Site Assessment, Area B-Highway Between Rose Avenue and 4th Street. April.

lead-based paint is identified, then federal and State construction worker health and safety regulations shall be followed during renovation or demolition activities. If loose or peeling lead-based paint is identified, it shall be removed by a qualified lead abatement contractor and disposed of in accordance with existing hazardous waste regulations.

The DTSP site is bordered on the north by the BNSF Railroad. Hazardous materials shipped on the line could present a hazard in the event of a spill. This line traverses through Oakley and poses a safety hazard in the event of train derailment or collision.

The transportation of hazardous materials is highly regulated at the Federal level by the US Department of Transportation (DOT). The Federal Railroad Administration (FRA), established by US DOT in 1966, enforces all regulations applicable to rail carriers, shippers by rail, and manufacturers of tank cars. FRA administers a number of safety programs affecting hazardous materials transportation by rail, including a Hazardous Materials Incident Reduction Program, a Tank Car Facility Conformity Assessment Program, a Tank Car Owner Maintenance Program, and an Education, Safety Assurance, Compliance, and Accident Investigation Program.

Additionally, implementation of the DTSP would not create additional crossings of the railroad line or change an existing crossing. Proposed development would be consistent with existing development within Oakley located along the railroad tracks and would not create land use conflicts with the railroad.

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school? ***(Potentially Significant Unless Mitigation Incorporated)***

Vintage Parkway Elementary School and Oakley Elementary School are located approximately ¼-mile from the DTSP area; no new schools are proposed within ¼-mile of the site. As described in Section VII.a, above, the proposed project envisions the construction of residential units and commercial space, and would not result in the routine use, transport, or disposal of substantial quantities of hazardous materials.

As described in Section VII.b, the implementation of the DTSP could expose sensitive receptors to hazardous materials, lead-based paint, and asbestos-containing materials. Implementation of Mitigation Measures HAZ-1 and HAZ-2, described above, would reduce this potential impact to a less-than-significant level.

d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment? ***(Potentially Significant Unless Mitigation Incorporated)***

Two sites within the DTSP area, 407 Main Street and 800 Main Street, are listed on the Cortese List as leaking underground tank (LUST) cleanup sites. These cases are listed as closed, with clean up completed.[14] Implementation of Mitigation Measure HAZ-1, described above, which requires the

[14] State Water Resources Control Board, 2008. List of Leaking Underground Storage Tank Sites by County and Fiscal Year from Water Board GeoTracker Database. Accessed September 2008. Website: geotracker.waterboards.ca.gov/.

completion of a Phase I Environmental Site Assessment, would determine if hazardous materials exist on potential development sites and would provide appropriate mitigation measures to reduce potential impacts to a less-than-significant level.

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?* ***(No Impact)***

The DTSP site is not located within an airport land use plan and is not within 2 miles of a public airport. Implementation of the DTSP would not result in a safety hazard for people working or residing in the area.

f) *For a project located within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?* ***(No Impact)***

The DTSP site is not located within the vicinity of a private airstrip. Implementation of the DTSP would not result in a safety hazard for people working or residing in the area.

g) *Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?* ***(Potentially Significant Unless Mitigation Incorporated)***

Implementation of the DTSP would result in construction of the Main Street Realignment, as well as development of vacant properties along the BNSF Railroad, and may interfere with an adopted emergency response plan or emergency evacuation plan. Implementation of the following two-part mitigation measure would reduce this impact to a less-than-significant level.

> Mitigation Measure HAZ-3a: Prior to approval of projects associated with the DTSP, the East County Fire Protection District, Oakley Public Works Department and the Oakley Police Department shall review and approve project design to ensure that the project does not impair implementation or physically interfere with emergency plans.

> Mitigation Measure HAZ-3b: Improvement plans for roadways constructed within the DTSP site shall be reviewed by the City of Oakley Planning Department and Public Works and Engineering Department to ensure that adequate width and turning radius is maintained on all roadways.

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?* ***(Less-Than-Significant Impact)***

The City of Oakley is classified by the California Department of Forestry and Fire Prevention as critical Fire Weather Class 3, with 9½ days or more of moderate, high, or extreme fire hazard per year and is within a local responsibility area where the local agencies (not State agencies) are solely responsible. Peat soils located north of the DTSP area, beyond the BNSF Railroad, pose a fire hazard because they are extremely difficult to extinguish once they ignite.

However, the DTSP site is located in an urban environment where fire services are provided. Implementation of the DTSP would not expose people or structures to a significant risk of loss, injury or death involving wildland fires.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
VIII. HYDROLOGY AND WATER QUALITY. Would the project:				
a) Violate any water quality standards or waste discharge requirements?	☐	■	☐	☐
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)?	☐	☐	■	☐
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?	☐	■	☐	☐
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?	☐	■	☐	☐
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 runoff?	☐	■	☐	☐
f) Otherwise substantially degrade water quality?	☐	☐	■	☐
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	■	☐	☐
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	■	☐	☐

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding of as a result of the failure of a levee or dam?	☐	■	☐	☐
j) Inundation by seiche, tsunami, or mudflow?	☐	☐	■	☐

a) *Violate any water quality standards or waste discharge requirements?* ***(Potentially Significant Unless Mitigation Incorporated)***

Water quality in surface and groundwater bodies is regulated by the State and Regional Water Quality Control Boards. The Central Valley Regional Water Quality Control Board (RWQCB) is responsible for implementation of State and federal water quality protection guidelines in Oakley. The RWQCB implements the Water Quality Control Plan (Basin Plan), a master policy document for managing water quality issues in the region. The Basin Plan establishes beneficial water uses for waterways and water bodies within the region.

Runoff water quality is regulated by the federal National Pollutant Discharge Elimination System (NPDES) Nonpoint Source Program (established through the Clean Water Act). The NPDES program objective is to control and reduce pollutants to water bodies from nonpoint discharges. The NPDES program is administered by the California Regional Water Quality Control Boards. The DTSP area is under the jurisdiction of the Central Valley RWQCB.

The City of Oakley is a participant in the Contra Costa Countywide Stormwater Pollution Prevention Program (STOPPP). The STOPPP maintains compliance with the NPDES Storm Water Discharge Permit and promotes storm water pollution prevention within that context. Compliance with the NPDES Permit is mandated by State and federal statutes and regulations.

Construction. The DTSP designates approximately 30 acres in downtown Oakley as redevelopment opportunity sites. Approximately 21 of these acres are currently vacant and development projects on these lots would substantially increase the amount of impervious surface coverage in the Downtown. The DTSP is a conceptual plan and specific grading, drainage or landscape plans have not yet been developed for these sites. All projects proposed as part of the DTSP would be required to submit grading and drainage plans to the Community Development Department for review and approval as part of the development review process. However, construction activities and post-construction land uses could result in degradation of water quality in nearby surface water bodies by reducing the quality of storm water runoff. Implementation of Mitigation Measure HYD-1 would reduce construction-related impacts to a less-than-significant level.

> Mitigation Measure HYD-1: For projects that disturb 10,000 square feet or more, the project applicant shall prepare a Storm Water Pollution Prevention Plan (SWPPP) designed to reduce potential impacts to surface water quality through the construction-period of the project. It is not required that the SWPPP be submitted to the RWQCB, but must be maintained on-site and made

available to RWQCB staff upon request. The SWPPP shall be submitted to the Community Development Department prior to approval of the grading plan. The SWPPP shall include:

- *Best Management Practices.* Specific and detailed Best Management Practices (BMPs) shall be designed to mitigate construction-related pollutants to a level of insignificance. At a minimum, BMPs shall include practices to minimize the contact of construction materials, equipment, and maintenance supplies (e.g., fuels, lubricants, paints, solvents, adhesives) with stormwater. The SWPPP shall specify properly designed centralized storage areas that keep these materials out of the rain.
- *Framework for Education*. An important component of the storm water quality protection effort is knowledge of the site supervisors and workers. To educate on-site personnel and maintain awareness of the importance of stormwater quality protection, site supervisors shall conduct regular tailgate meetings to discuss pollution prevention. The frequency of the meetings and required personnel attendance list shall be specified in the SWPPP.
- *Monitoring Plan.* The SWPPP shall specify a monitoring program to be implemented by the construction site supervisor, and must include both dry and wet weather inspections. In addition, in accordance with State Water Resources Control Board Resolution No. 2001-046,[15] monitoring would be required during the construction period for pollutants that may be present in the runoff that are "not visually detectable in runoff."[16] RWQCB personnel, who may make unannounced site inspections, are empowered to levy considerable fines if it is determined that the SWPPP has not been properly prepared and implemented.
- *Soil Erosion.* Soil erosion BMPs designed to reduce erosion of exposed soil may include, but are not limited to soil stabilization controls, watering for dust control, perimeter silt fences, placement of hay bales, and sediment basins. The potential for erosion is generally increased if grading is performed during the rainy season as disturbed soil can be exposed to rainfall and storm runoff. If grading must be conducted during the rainy season, the primary BMPs selected shall focus on erosion control, that is, keeping sediment on the site. End-of-pipe sediment control measures (e.g., basins and traps) shall be used only as secondary measures. If hydroseeding is selected as the primary soil stabilization method, then these areas shall be seeded by September 1 and irrigated as necessary to ensure that adequate root development has occurred prior to October 1. Entry and egress from the construction site shall be carefully controlled to minimize off-site tracking of sediment. Vehicle and equipment wash-down facilities shall be provided and designed to be accessible and functional during both dry and wet conditions.

Project Operation. In addition to complying with construction period pollution prevention requirements where appropriate, new development must comply with Provision C.3 of NPDES over the life of the project by implementing a Stormwater Control Plan to treat runoff and, for larger projects, ensure that post-project runoff does not exceed pre-project rates or duration. Implementation

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[15] State Water Resources Control Board, 2001. Modification of Water Quality Order 99-08-DWQ State Water Resources Control Board (SWRCB) National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction Activity.

[16] Construction materials and compounds that are not stored in water-tight containers under a water-tight roof or inside a building are examples of materials for which the discharger may have to implement sampling and analysis procedures.

of the following two-part mitigation measure would reduce potential water quality impacts to a less-than-significant level.

Mitigation Measure HYD-2a: Consistent with City of Oakley Municipal Code[17], the project applicant for each project developed under the DTSP that creates 10,000 square feet of new, additional or replacement impervious area, including street and roadway projects, shall submit a Stormwater Control Plan to the Community Development Department, along with the development application. Design characteristics, landscape features, and Best Management Practices (BMPs) identified in the Stormwater Control Plan should minimize impervious surfaces, retain and detain stormwater, slow runoff rates, and reduce the discharge of pollutants to the *maximum extent practicable* and should be designed to treat 80 percent of average annual runoff, consistent with NPDES permit provision C.3.d.

The plan should be prepared simultaneously with the preliminary site plan and landscaping plan and considered by the Community Development Department as part of the project application. The plan should be certified by a qualified architect, landscape architect, or civil engineer. Implementation of the Stormwater Control Plan shall be a condition of approval for the project.

Prior to issuance of a Certificate of Occupancy, the project applicant shall submit a detailed Stormwater Control Operation and Maintenance Plan to the Building Department.

Mitigation Measure HYD-2b: In addition to requirements for treatment measures listed above, the project applicant for each project that creates one or more acres of impervious surface shall demonstrate compliance with flow-control requirements such that post-project runoff does not exceed estimated pre-project rates or durations. The project applicant must demonstrate compliance with Contra Costa County's Hydrograph Modification Management Plan (HMP) using one of four options described in the County's Stormwater C.3 Guidebook.[18]

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)?* ***(Less-Than-Significant Impact)***

Development/redevelopment projects within the DTSP would be served by the Diablo Water District and would not result in direct additions or withdrawals to existing groundwater. The District distributes treated surface water from the Central Valley Project purchased from the Contra Costa Water District (CCWD).[19] In addition, the District is developing a groundwater supply system and currently operates four wells.[20] The potential for a lowered water table has been investigated by the

[17] City of Oakley Municipal Code Title 6, Chapter 11, Stormwater Management and Discharge Control.

[18] Contra Costa Clean Water Program, 2006. *Stormwater Quality Requirements for Development Applications-Stormwater C.3 Guidebook*. October.

[19] Diablo Water District, 2005. *Urban Water Management Plan, Final Report*. December. Pg. 4-1.

[20] Diablo Water District, op. cit., pg. 4-3.

District and found to be low.[21] Therefore, implementation of the DTSP would not 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, either directly or indirectly. Additionally, the DTSP area represents a small portion of the recharge area and development projects would not have a substantial impact on groundwater recharge.

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?* ***(Potentially Significant Unless Mitigation Incorporated)***

Implementation of the DTSP would not result in the alteration of a stream or river. However, the projects envisioned under the DTSP could result in an increase in impervious surfaces within the Downtown area. Increased runoff quantities and rates could contribute to substantial erosion or siltation on- or off-site. Implementation of Mitigation Measures HYD-1, HYD-2a and HYD-2b (as appropriate) would reduce this impact to a less-than-significant level.

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?* ***(Potentially Significant Unless Mitigation Incorporated)***

Implementation of the DTSP would not result in the alteration of a stream or river. However, implementation of the DTSP could substantially alter the existing drainage pattern of the site and could substantially increase the rate and amount of surface runoff as a result of increased impervious surfaces. Implementation of Mitigation Measures HYD-1, HYD-2a and HYD-2b (as appropriate) would reduce this impact to a less-than-significant level.

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 runoff?* ***(Potentially Significant Unless Mitigation Incorporated)***

Implementation of the DTSP could create runoff exceeding the capacity of existing storm drain systems or could provide additional sources of polluted runoff. Implementation of Mitigation Measures HYD-1, HYD-2a and HYD-2b (as appropriate) would reduce this impact to a less-than-significant level.

f) *Otherwise substantially degrade water quality?* ***(Less-Than-Significant Impact)***

Implementation of the DTSP would not substantially degrade water quality beyond those impacts discussed in Section VIII.a.

[21] Diablo Water District, op. cit., pg. 4-5.

g) *Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?* ***(Potentially Significant Unless Mitigation Incorporated)***

The majority of the DTSP area is not within a special flood hazard area. However, two areas in the south/central DTSP area are located in the 100-year floodplain (along Landis Avenue between Norcross Lane and O'Hara Avenue and along Second Street between E. Ruby Street and Las Dunas Avenue). Redevelopment in these areas could place or improve housing within a 100-year flood hazard area. Implementation of General Plan Policy 8.2.1, which states that, "applications for development at urban or suburban densities in 100-year floodplain areas where there is a serious risk to life and property shall demonstrate appropriate solutions or be denied," along with implementation of the following mitigation measure would reduce this impact to a less-than-significant level.

> Mitigation Measure HYD-3: Consistent with City of Oakley Standard Conditions of Approval, the project applicant for any project area located in the 100-year floodplain shall submit a Letter of Map Revision application or the appropriate application to the Federal Emergency Management Agency (FEMA) to remove the building pads that are currently within the Special Flood Hazard Area Zone A[22] from the flood zone. FEMA must issue no less than a Conditional Letter of Map Revision prior to the City issuing building permits for the lots affected by the Zone A designation. The applicant should be aware of the requirements of the Federal Flood Insurance Program and the City Floodplain Management Ordinance as they pertain to future construction of any structures on this property.

h) *Place within a 100-year flood hazard area structures which would impede or redirect flood flows?* ***(Potentially Significant Unless Mitigation Incorporated)***

See Section VIII.g., above.

i) *Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding of as a result of the failure of a levee or dam?* ***(Potentially Significant Unless Mitigation Incorporated)***

The majority of flood hazards within the City of Oakley relate to the system of levees that protect the islands and adjacent mainland. Levee failure can result from underlying soil stability problems from soft mud, peat, or silt and can be exacerbated by erosion caused by waves from boat movement or earthquakes. The DTSP site is not within an area subject to inundation as a result of levee failure. Failure of the Los Vaqueros Reservoir, located south of Oakley, due to a major earthquake could generate flooding as water moves to the Delta. However, such a failure would not impact the City of Oakley and the City is not at risk for inundation by a dam failure.[23] Therefore, implementation of the DTSP would not expose people or structures to a significant risk of loss, injury or death involving failure of a levee or dam.

[22] FEMA defines Zone A as areas with a 1 percent annual chance of flooding and a 26 percent chance of flooding over the life of a 30-year mortgage. No depths or base flood elevations are shown within these zones because detailed analyses are not performed for such areas.

[23] Oakley, City of, 2002. *Oakley 2020 General Plan, Chapter 8: Health and Safety*. Pg. 8-18.

Portions of the DTSP site are located within Special Flood Hazard Area Zone A, as described above. Implementation of Mitigation Measure HYD-3 would reduce flooding impacts to these properties a less-than-significant level.

j) Inundation by seiche, tsunami, or mudflow? ***(Less-Than-Significant Impact)***

The DTSP area would not be subject to inundation by a seiche, tsunami, or mudflow[24] due to the surrounding elevation and distance from the Bay.

IX. LAND USE AND PLANNING. Would the project:	**Potentially Significant Impact**	**Potentially Significant Unless Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Physically divide an established community?	☐	☐	■	☐
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?	☐	☐	■	☐
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	■

a) Physically divide an established community? ***(Less-Than-Significant Impact)***

The DTSP is consistent with the City of Oakley General Plan, which is "designed to protect, preserve, and maintain the community character."[25] Goals of the Downtown Plan to "Improve Main Street's Overall Appearance," "Enhance the Pedestrian Environment," and "Promote Higher Density Infill Development" as implemented through specific capital improvements such as street frontage improvements and sidewalk construction and widening would enhance the connectivity with surr-ounding communities. Approximately 30 acres, or 40 percent, of the DTSP area consists of vacant land. Development projects that would occur with implementation of the DTSP would increase the utilization of such areas as well as increase pedestrian and vehicle connections through the area.

[24] Association of Bay Area Governments (ABAG), 2005. *ABAG Multi-Jurisdictional Local Hazard Mitigation Plan for the Bay Area, Contra Costa Water District Annex.* Adopted by Board resolution, February 1, 2006.

[25] Quad Knopf, Inc., 2002. *City of Oakley General Plan Draft EIR.* September 13. Pg. 3-13

The Main Street Realignment would be consistent with the DTSP's objectives to improve the overall appearance of the Downtown. The realignment would provide vehicular and pedestrian access to adjacent commercial properties, while redirecting through vehicle and truck traffic away from Main Street. Pedestrian access along and across the realignment would be provided on sidewalks and at signalized intersections. Landscaping, lighting and bicycle lanes are recommended where feasible. Therefore, implementation of the DTSP would not physically divide an established community.

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? ***(Less-Than-Significant Impact)***

The City of Oakley General Plan designates a Downtown Mixed-Use Special Planning Area which coincides with part of the area within the DTSP site. The General Plan vision for this special planning area includes the intensification of commercial and residential uses to establish a core activity center for the downtown.

The City of Oakley General Plan is the guiding land use policy document for the DTSP area. The DTSP implements the General Plan policies for downtown and clarifies the previous Downtown Revitalization Strategy and defines revitalization programs.[26] The Downtown Plan is consistent with applicable plans and polices.

c) Conflict with any applicable habitat conservation plan or natural community conservation plan? ***(No Impact)***

Refer to Section IV.f. Implementation of the DTSP would not conflict with the ECC HCP/NCCP.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
X. MINERAL RESOURCES. Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the State?	❐	❐	❐	■
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?	❐	❐	❐	■

a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the State? ***(No Impact)***

[26] Oakley, City of, 2006. *Downtown Design and Development Plan*. City of Oakley, Planning Division. Oakley, California. October. Pg. 17.

The DTSP site is located in a developed urban area. There are no known mineral resources or mineral resources processing facilities present in the area, and implementation of the DTSP would not result in the loss of availability of a known mineral resource of value.

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? ***(No Impact)***

The DTSP site is not designated as an area containing important mineral resources by the City of Oakley General Plan. Additionally, the County General Plan does not delineate locally-important mineral resource recovery sites within the area.[27]

XI. NOISE. Would the project result in:	**Potentially Significant Impact**	**Potentially Significant Unless Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
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) Exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels?	■	❒	❒	❒
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	■	❒	❒	❒
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	■	❒	❒	❒
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?	❒	❒	❒	■
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	❒	❒	❒	■

[27] Contra Costa County, 2005. *Contra Costa County General Plan 2005-2020*. January. Figure 8-4, Mineral Resource Areas.

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? ***(Potentially Significant Impact)***

Existing primary noise sources within the DTSP area are traffic and railroad noise. Implementation of the DTSP could result in increased noise levels related to construction of projects envisioned by the DTSP, including the Main Street Realignment and Main Street Improvements, as well as increased operational noise levels in the vicinity of the Downtown. The DTSP's potential noise impacts will be evaluated in the EIR.

b) Exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels? ***(Potentially Significant Impact)***

The existing railroad line, the new Main Street Realignment and the Main Street Improvements, as well as other construction activities envisioned by the DTSP, could expose persons in the vicinity of the DTSP area to excessive ground borne vibration or ground borne noise levels. The DTSP's potential impacts from ground borne vibrations will be evaluated in the EIR.

c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project? ***(Potentially Significant Impact)***

Long-term uses within the DTSP area would include mixed-uses, such as retail sales, night clubs, restaurants, cultural and civic facilities, residential, office, and other uses. The DTSP's potential impacts on ambient noise levels in the project vicinity will be evaluated in the EIR.

d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project? ***(Potentially Significant Impact)***

Construction activities associated with DTSP projects could result in high intermittent noise levels. The DTSP's potential impacts on temporary or periodic ambient noise levels in the project vicinity will be evaluated in the EIR.

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? ***(No Impact)***

The DTSP area is not located within an airport land use plan nor within 2 miles of a private or public airport or public use airport and, thus, would not expose people residing or working within the project area to excessive noise levels from aircraft related or airport use related sources.

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels? ***(No Impact)***

See Section XI.e.

XII. POPULATION AND HOUSING. Would the project:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
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) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	❒	❒	■	❒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	❒	❒	■	❒

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)? ***(Less-Than-Significant Impact)***

Between 1990 and 2000 the City of Oakley's population grew by approximately 40 percent, from 18,374 to 25,619.[28] The City's estimated population in 2008 was 33,210, with an average household size of 3.21 persons. The total number of housing units was estimated as 10,476.[29] For 2010, the total jobs within Oakley are estimated to be 3,750.[30]

By 2030, the City is projected to have a population of 40,050 with 12,670 households. Additionally, the City is estimated to have 8,120 jobs.[31] The City General Plan estimates a build-out population of 68,371 persons.[32]

The DTSP area currently has approximately 75 residential units and approximately 950 jobs.[33] Implementation of the DTSP could result in a net increase of up to 300 dwelling units. The population increase that may result from implementation of the plan would be approximately 963 persons (300 x

[28] Oakley, City of, 2002. *Oakley 2020 General Plan, Chapter 10: Housing Element.* Pg. 10-2.

[29] California Department of Finance, 2008. *E-5 City/County Population and Housing Estimates, 2008, Revised 2001-2008, with 2000 Benchmark*. Website: www.dof.ca.gov. January.

[30] Estimate for the jurisdictional boundary of the City. Source: Association of Bay Area Governments (ABAG), 2006. *Projections 2007- Forecasts for the San Francisco Bay Area to the Year 2035*. December.

[31] ABAG, 2006, op. cit.

[32] Oakley, City of, 2002. *Oakley 2020 General Plan, Chapter 10: Housing Element.* Pg. 10-2.

[33] Estimates based on interpolation between 2000 and 2010 land uses as included in the CCTA Countywide Travel Demand Model. The land uses were checked against existing aerials and modified accordingly. Source: Fehr & Peers, 2007. *Land Use Assumptions for Use in the Travel Demand Model.* Written communication to LSA Associates. January 15.

3.21 = 963). This population growth represents an increase of approximately 2.9 percent of the City's current population and approximately 14 percent of the anticipated population growth through 2030.

The DTSP anticipates approximately 360,000 square feet of retail/commercial space and development/redevelopment of eight opportunity sites. This new commercial space is estimated to result in a net increase of 665 new jobs.[34] This job growth represents approximately 18 percent of the City's current jobs and approximately 15 percent of the anticipated job growth through 2030.
This direct plan-envisioned population and employment growth, as well as any indirect growth that it would generate, would not be substantial as a proportion of overall anticipated City growth in the coming decades.

b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere? ***(Less-Than-Significant Impact)***

The Main Street Realignment would result in the displacement of up to 5 commercial structures and 11 residential units. In addition, the DTSP would allow for the conversion of existing residential structures to commercial spaces within the Residential/Commercial Conversion Opportunity Area (the area south of the Downtown Support area bounded by Ruby Street and Home Street, and Norcross Lane and Del Antico Avenue). The number of units that might be converted from residential to commercial use is not known at this time. The City of Oakley would comply with applicable State legislation including the California Redevelopment Law and the California Relocation Act for the relocation of buildings required for the construction of the Main Street Realignment.

The DTSP anticipates a net increase of approximately 300 new dwelling units. These new units would offset the potential loss of housing that may result from implementation of the DTSP policies and Main Street Realignment.

c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere? ***(Less-Than-Significant Impact)***

As described in Section XII.b., above, implementation of the DTSP could result in a net increase in the number of dwelling units, despite the development/redevelopment of existing residential areas for commercial uses. The DTSP would not result in the displacement of substantial numbers of people.

[34] Number of jobs based on 2 jobs per thousand square feet for retail, 4 jobs per thousand square feet for office, and 1.67 jobs per thousand square feet of industrial space. Source: Ibid.

XIII. PUBLIC SERVICES.	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
a) 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 could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
Fire protection?	☐	■	☐	☐
Police protection?	☐	☐	■	☐
Schools?	☐	☐	■	☐
Parks?	☐	☐	■	☐
Other public facilities?	☐	☐	■	☐

a) *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 could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: Fire protection, police protection, schools, parks, other public facilities?* ***(Potentially Significant Unless Mitigation Incorporated)***

Fire. The East County Fire Protection District provides fire protection services to Oakley and surrounding areas including Bethel Island, Brentwood, Byron, Discovery Bay, Knightsen, and portions of the Marsh Creek canyon and Morgan Territory. The District has a total of 56 full-time administrative and on-shift suppression personnel. Station 93 serves the area of Oakley and is located downtown at 215 Second Street, within the DTSP area. This station has two Type 1 engines, a Type 3 engine, and a Type 4 mini-pumper. The Type 3 and Type 4 engines provide wildland protection services.[35]

Station 93 is staffed with a minimum of two fire fighters including a Fire Fighter 1 and an EMT at all times. Paid on-call volunteers or reserves provide additional staff in an emergency.[36] Station 93 has an

[35] Henderson, Hugh, 2008. Fire Chief, East Contra Costa Fire Protection District. Personal communication with LSA Associates, Inc. October 16.

[36] Ibid.

average 6-minute response time for emergency calls.[37] Statistics on response times for non-emergency calls are not compiled by the District.

The Contra Costa County Fire Protection District provides dispatch service for the East County District and conducts building inspections and plan review for the City of Oakley. The plan review board would review projects proposed under the DTSP and would assess: built-in fire protection and early detection systems; adequacy of water supply; flammability of building materials; access for emergency vehicles and EMS conveyance accessibility (doorways, stairways, etc).

Traffic congestion, building type, and occupancy loads can affect fire services in the Downtown. Currently, the Type 1 engine at Station 93 has a 35-foot ladder, which can serve up to two-story buildings. The DTSP allows for construction of buildings up to a maximum of four floors and/or 50 feet in height. If buildings taller than two stories are constructed prior to the acquisition of a ladder/engine to serve higher buildings, then adequate fire protection services would not be maintained in the Downtown. General Plan Policy 8.4.3 requires that adequate access be provided for medical emergency equipment in high-occupancy buildings over two stories in height. General Plan Policy 8.4.4 requires that all buildings greater than two stories in height be designed and constructed to provide for the evacuation of occupants and/or for the creation of a safe environment in case of a substantial disaster, such as a severe earthquake or fire. Implementation of these General Plan policies, along with implementation of the following mitigation measure would reduce this impact to a less-than-significant level.

> Mitigation Measure PUB-1: Prior to issuance of a building permit for buildings greater than two stories in height, the Community Development Department shall receive confirmation from the East County Fire Protection District that the District has adequate equipment to serve the proposed project or that the specific building design otherwise provides a safe environment in the event of a severe earthquake or fire.

Police. The Oakley Police Department provides law enforcement services for the City through a contract with the Contra Costa County Sheriff's Department for personnel, dispatch, records, and basic equipment services. The police department supports a Community Oriented Policing and Problem Solving Program (COPPS) to encourage community participation and education on safety issues.

The police station is located at 3231 Main Street. The department has 28 sworn officers, and three full-time equivalency staff.[38] The police fleet consists of 23 vehicles including administrative cars, an emergency trailer, and a speed enforcement trailer.

There are two to three beats in the City, depending on the number of police officers on duty, staffed by one officer per beat.[39] Implementation of the DTSP would incrementally contribute to the need for expanding personnel and facilities space. However, this impact would not be considered significant as it is not anticipated that this project would directly trigger the need for new or physically altered

[37] Ibid.

[38] Thorsen, Chris, 2008. Police Chief, City of Oakley. Personal communication with LSA Associates, Inc. October 23.

[39] Ibid.

government facilities, the construction of which could cause potential significant environmental impacts. Additionally, new residential units within the City are taxed to pay for police services and would contribute funds to offset impacts to police services.

Schools. The Oakley Union Elementary School District (OUESD) and the Liberty Union High School District (LUHSD) provide school services to the City of Oakley, including the DTSP site. The OUESD operates five elementary schools serving kindergarten through fifth grade and two middle schools serving sixth through eighth grade, as shown in Table 2.

Table 2: OUESD Schools – Enrollments and Capacities

School	2007-2008 Enrollment	Maximum Capacity
Elementary Schools		
Gerhinger School	622	650
Iron House School	504	650
Laurel School	679	726
Oakley School	523	650
Vintage Parkway School	592	650
Middle Schools		
Delta Vista School	947	1,080
O'Hara Park School	795	800
Total Enrollment	**4,662**	**5,206**

Source: Oakley Union Elementary School District, 2008.

Measure H was passed in November 2004 in order to address the increasing demand for school services. The measure provided funds for major modernization projects at Oakley Elementary School and Gehringer Elementary School and funds for construction of Iron House Elementary School, which opened in October 2006. Almond Grove School was also recently completed but has not opened due to the current lack of demand.
The District anticipates substantial growth in the area that could result in the doubling of the District's size over the next eight to ten years and is planning to build five additional elementary schools and two additional middle schools.[40]

The LUHSD serves the communities of Oakley, Brentwood, Knightsen, Discovery Bay, and Byron. District schools include: Liberty High School, Freedom High School, Heritage High School, which opened August 2005, La Paloma High School, a continuation school, and Independence High School, an alternative school. Additionally, the District operates an adult education center in Brentwood. School enrollment is shown in Table 3. The LUHSD schools that serve Oakley include: Freedom High School, La Paloma High School and Liberty Alternative Education Center. Freedom High School is expected to be overcrowded until a new high school is constructed (anticipated opening in 2013-2014, depending upon demand).[41]

Table 3: LUHSD Schools - Enrollments and Capacities

School	2007-2008 Enrollment	Maximum Capacity
Liberty High School	2,013	2,200
Freedom High School	2,270	2,200
Heritage High School	1,882	2,200
La Paloma High School	190	190
Independence High School	356	578
Total Enrollment	6,711	7,368

Source: Liberty Union High School District, 2008.

[40] Oakley Union Elementary School District, 2008. *About Our District*. Website: www.ouesd.k12.ca.us/Pages/about-us.html.

[41] Reeves, Wayne, 2008. LUHSD Director of Project Development. Personal communication with LSA Associates. October 9.

Based on student generation rates, implementation of the DTSP could generate approximately 225 elementary/middle school students[42] and 65 high school students.[43] Growth is anticipated by both school districts and could be accommodated by the existing and new schools planned in each district.

Projects proposed under the DTSP would pay impact fees to the OUESD including: $3.80 per square foot for residential development; $0.33 per square foot for commercial development; $0.20 per square foot of heavy industrial uses; $0.03 per square foot for self-storage; and $0.01 per square foot for parking garage.[44] Development fees charged by the LUHSD include: $1.49 per square foot for residential and $0.14 per square foot for commercial projects.[45] Expansion of district schools is planned for both districts in order to accommodate the projected enrollment growth. Developer's fees collected from projects proposed under the DTSP would offset some impacts resulting from additional school-age children. The expansion of school facilities that is anticipated by the two districts would require environmental review at the time the expansions are planned. Therefore, implementation of the DTSP would result in a less-than-significant impact to school facilities.

Parks. Parks in Oakley are generally classified into Neighborhood and Community Parks. Neighborhood Parks typically abut residential neighborhoods and serve a single neighborhood while community parks serve several neighborhoods. Additionally, the City has established relationships with regional agencies to serve local community park needs including school/park joint-use agreements with Oakley Union Elementary School District and Contra Costa County.

The City's General Plan establishes a standard of 6 acres per 1,000 residents. This acreage is divided as follows: 2 acres per 1,000 residents for neighborhood parks; 3 acres per 1,000 residents for community parks; and 1 acre per 1,000 residents for open space and special recreation areas. Based on the 2002 General Plan, total parkland was 188.48 acres which included: 24.48 acres of neighborhood parks; 48.11 acres of community parks; 65.07 acres of joint-use school/community parks; 44.57 acres of regional parks; and 6.25 acres of open space.[46] The City currently has 5.68 acres per 1,000 residents.[47]

In addition to parks, City of Oakley recreation opportunities include trails and open space areas. Approximately 39 miles of regional multi-use trails are located in the area including: Delta de Anza Trail; Marsh Creek Regional Trail; and Big Break to Antioch Pier. The San Joaquin River Delta is a predominant physical feature in Oakley and serves as an open space area. As an extension of the river

[42] Student generation rates for Oakley Union Elementary School District: 0.50 students per residential unit for kindergarten through fifth grades and 0.25 students for sixth through eighth grades. Source: Partida, Heather. OUESD Administrative Assistant to the Superintendent. Personal communication with LSA Associates. October 14.

[43] Student generation rates for Liberty Union High School District: 0.217 students per residential unit. Source: Reeves, Wayne, 2008. LUHSD Director of Project Development. Personal communication with LSA Associates. October 9.

[44] Partida, Heather. OUESD Administrative Assistant to the Superintendent. Personal communication with LSA Associates. October 14.

[45] Reeves, Wayne, 2008. LUHSD Director of Project Development. Personal communication with LSA Associates. October 9.

[46] Oakley, City of, 2002. *Oakley 2020 General Plan, Chapter 7.0: Parks and Recreation Element.* Table 7-1, Oakley Park Facilities Inventory, Pg. 7-19.

[47] Based on the City's population of 33,210 persons. Source: California Department of Finance, op. cit.

delta, Dutch Slough is a contiguous area of agricultural and ruderal lands. These open space areas include both land and waterways and are designated by the General Plan for preservation, recreation, public safety, and managed production of resources.

Both the current park acreage-to-resident ratio and the pattern and rate of development in the City indicate that the City should acquire more parkland. The General Plan emphasizes the need for more parkland development and the existing deficit in recreation resources.[48] The City has established a parkland dedication requirement or in-lieu fee in addition to development impact fees for parks. Developer impact fees for parks are $1,064 per 1,000 square feet of commercial, $8,324 per single family unit and $5,439 per multi-family residential unit.[49]

The DTSP is served by several parks including: Oakley Fire District Station No. 93 (0.20-acre mini-park), Oakley Elementary School (4-acre joint use playfields and park), Laurel Ballfields Park (13.63-acre community park with playfields and park); and the recently constructed Civic Center Plaza/Park (1 acre). As a result, the majority of the DTSP is served by either a neighborhood or community park.

The approximately 963 new residents of the DTSP site would not substantially decrease parkland-to-resident ratios. Therefore, implementation of the DTSP would not result in substantial adverse physical impacts associated with the provision, need, or construction of government facilities to maintain acceptable service ratios for park and recreation facilities.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
XIV. 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) 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?	❒	■	❒	❒

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? ***(Less-Than-Significant Impact)***

[48] Oakley, City of, 2002, op. cit., pg. 7-20.

[49] Strelo, Kenneth, 2007. Senior Planner, City of Oakley. Personal correspondence with LSA Associates, Inc. April 5.

Implementation of the DTSP could increase the number of residents in the Downtown area by approximately 963 persons. This population increase would result in an incremental increase in the use of neighborhood and community parks and recreational facilities serving the DTSP site, including the Oakley Fire District Station No. 93 park, Civic Center Plaza/Park, Oakley Elementary School (joint use playfields and park), and Laurel Ballfields Park. The incremental increase in park and recreational facility use that would be generated by the proposed project would not result in substantial physical deterioration of these areas.

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? ***(Potentially Significant Unless Mitigation Incorporated)***

Aside from public landscaped areas, the DTSP does not propose the development of parks within the DTSP area. However, parks may be developed under the parkland dedication requirement and construction and operation of such parks could result in polluted stormwater runoff. However, implementation of Mitigation Measures HYD-1, HYD-2a, and HYD-2b (as appropriate) would reduce this impact to a less-than-significant level.

XV. TRANSPORTATION/TRAFFIC. Would the project:	**Potentially Significant Impact**	**Potentially Significant Unless Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
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)?	■	❐	❐	❐
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency or designated roads or highways?	■	❐	❐	❐
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	■	❐	❐	❐
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	■	❐	❐	❐
e) Result in inadequate emergency access?	■	❐	❐	❐
f) Result in inadequate parking capacity?	■	❐	❐	❐

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
g) Conflict with adopted polices, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	■	❒	❒	❒

Implementation of the DTSP would increase the number of vehicles on local and regional roadways, and could cause traffic congestion. The construction of the Main Street Realignment and Main Street Improvements would change circulation, access and transportation in the Downtown. The DTSP's potential impacts on transportation will be evaluated in the EIR.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
XVI. UTILITIES AND SERVICE SYSTEMS. Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	❒	❒	■	❒
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?	❒	■	❒	❒
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?	❒	❒	■	❒
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	❒	❒	■	❒
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?	❒	❒	■	❒
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	❒	❒	■	❒
g) Comply with federal, State, and local statutes and regulations related to solid waste?	❒	❒	■	❒

a) *Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?* ***(Less-Than-Significant Impact)***

The DTSP site is located in an urban area that is already served by utilities and public service systems; however, the change in uses and additional development associated with implementation of the DTSP would result in an increase in wastewater generation. As part of the building permit review process, all departments and agencies responsible for providing utilities and public services would be consulted to determine their ability to provide services to development projects proposed under the DTSP. Implementation of the DTSP is not expected to exceed wastewater treatment requirements of the Regional Water Quality Control Board.[50]

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?* ***(Potentially Significant Unless Mitigation Incorporated)***

The Diablo Water District (DWD) provides water services to Oakley. The District's Urban Water Management Plan anticipates population growth for the service area and estimates a buildout population of approximately 75,000.[51] Ultimately, the District will provide services to Oakley, the Town of Knightsen, and some or all of Bethel Island. As of 2005, the District served roughly half of this ultimate service area.

The DWD purchases wholesale treated water from the Contra Costa Water District (CCWD). The CCWD receives water from the Sacramento-San Joaquin Delta under a contract with the federal Central Valley Project. In 1998 the CCWD completed construction of Los Vaqueros Reservoir, which has a storage capacity of 100,000 acre-feet. The DWD has a joint powers agreement with CCWD for 15 million gallons per day (mgd) for treated water from the Randall-Bold Water Treatment Plant and has the right to purchase an additional 15 mgd. Deliveries on the hottest days have generally not exceeded a little over 8 mgd.[52] In addition, the District is developing a groundwater supply system and currently operates four wells.[53]

The DTSP implements the vision of the Oakley 2020 General Plan and would not create substantial new unanticipated water demand. The demand for water treatment is anticipated as part of the buildout for the City of Oakley and is analyzed within the District's Urban Water Management Plan.

The Ironhouse Sanitary District provides wastewater treatment services to Oakley and unincorporated areas of the County. The District owns and operates wastewater collection, treatment, storage, and effluent recycling facilities. The District's wastewater treatment plant has a capacity of 2.7 mgd and an

[50] Skrel, Jennifer, 2008. District Engineer, Ironhouse Sanitary District. Personal communication with LSA Associates, Inc. October 15.

[51] Diablo Water District, 2005. *Urban Water Management Plan, Final Report*. December. Pg. 2-2.

[52] Oakley, City of, 2006. *Community Services, Water District, History of Diablo Water District.* Website: www.ci.oakley.ca.us/html/community/utility/water.asp.

[53] Diablo Water District, op. cit., pg. 4-3.

average daily flow of approximately 2.6 mgd and is currently operating near capacity.[54] The District is planning a new treatment facility, which will be constructed in phases and will ultimately provide a total treatment capacity of 8.6 mgd. The first phase of the facility should be operational in 2011 and will add 4.3 mgd additional capacity, resulting in a total capacity of 7 mgd. The second phase for the treatment plant is not yet planned.[55] The District anticipates that there is sufficient capacity to provide expected wastewater flows in the interim before the first phase is completed.

Development proposed under the DTSP could result in approximately 68,678 gpd of wastewater flow.[56] This represents less than one percent of the District's anticipated 2011 treatment capacity.

Wastewater from the western portion of the DTSP area (west of Vintage Parkway) would flow westerly and enter the existing 8- and 10-inch sewers. The area east of Vintage Parkway would flow easterly and enter existing 15- and 21-inch sewers. The District recently completed work to re-route a portion of flows out of the existing 21-inch sewer to accommodate future development, including development under the DTSP, and anticipates project operation by the end of 2011, once the new wastewater treatment plant is on-line.[57]

Sewer infrastructure within the DTSP area is generally old and does not meet the standard 8-inch minimum sizing requirements. These sewers cannot accommodate additional flow. In areas with older systems, a new sewer infrastructure system would be required to serve projects developed under the DTSP. Implementation of General Plan Policy 4.9.4 and Programs 4.9.A and 4.9.D from the Wastewater Services section of the Growth Management Element along with implementation of the following two-part mitigation measure would reduce this impact to a less-than-significant level.

> <u>Mitigation Measure UTL-1a</u>: Specific development projects proposed under the DTSP shall demonstrate adequate sewerline capacity and integrity to serve the project. Sewer lines that are substandard shall be replaced, consistent with the Ironhouse Sanitary District standards. The City shall coordinate line replacement with the District and the project applicant shall pay for their fair share of improvements.

> <u>Mitigation Measure UTL-1b</u>: Additionally, the General Plan policy and programs from the Wastewater Services section of the Growth Management Element listed below would reduce this potential impact.

- <u>Policy 4.9.4</u>: Reduce the need for sewer system improvements by requiring new development to incorporate water conservation measures, which reduce flows into the sanitary sewer system.
- <u>Program 4.9.A</u>: Require new development to pay its fair share of the cost of on- and off-site infrastructure. This shall include installation of necessary public facilities, payment of impact fees, and participation in a Capital Improvement Program.

[54] Skrel, Jennifer, 2008. District Engineer, Ironhouse Sanitary District. Personal communication with LSA Associates, Inc. October 15.

[55] Ibid.

[56] Based on an estimated waste generation rates of 200 gpd per dwelling unit and 1,050 gallons per acre per day (gpad) for commercial uses. Waste generation rates from the Ironhouse Sanitary District.

[57] Skrel, Jennifer, 2009. District Engineer, Ironhouse Sanitary District. Personal communication with the City of Oakley. August 6.

- Program 4.9.D: At the project approval stage, require new development to demonstrate that wastewater treatment capacity can be provided. The City shall obtain assurance that 1) capacity exists within the wastewater treatment system if a development project is built within a set period of time, or 2) capacity will be provided by a funded program or other mechanism. This finding will be based on information furnished or made available to the City from consultations with the Ironhouse Sanitation District, the applicant, or other sources.

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? ***(Less-Than-Significant Impact)***

Storm water drainage facilities are provided by the City of Oakley and the Contra Costa County Flood Control and Water Conservation District (CFCWCD). The DTSP site is located in CFCWCD drainage fee areas 29C, 29D and 29E. Projects developed under the DTSP would be required to comply with the Contra Costa Clean Water Program's NPDES Permit and projects that meet established thresholds would be required to detain and treat 80 percent of average annual runoff. Existing storm water infrastructure serving the DTSP area is adequate to convey additional runoff from projects developed under the DTSP.[58] Therefore, implementation of the DTSP would not result in the construction or expansion of stormwater drainage facilities, the construction of which could cause significant environmental effects.

d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed? ***(Less-Than-Significant Impact)***

See XVI.b, above.

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? ***(Less-Than-Significant Impact)***

See XVI.b, above.

f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs? ***(Less-Than-Significant Impact)***

Oakley Disposal Service and Mount Diablo Recycling provide solid waste collection and recycling services to the City of Oakley. Solid waste is hauled to the Recycling Center and Transfer Station in Pittsburg and the residual material is hauled to Potrero Hills Landfill in Solano County. Although the Potrero Hills Landfill has an estimated closure date of 2011, it has a remaining capacity of 8.2 million cubic yards (38 percent).[59] Existing landfills have sufficient permitted capacity to accommodate the solid waste disposal needs associated with implementation of the DTSP.

[58] Bourgeois, Allen, 2007. Assistant Engineer, City of Oakley. Personal communication with LSA Associates, Inc. July 3.

[59] California Integrated Waste Management Board, 2006. *Active Landfills Profile for Potrero Hills Landfill (48-AA-0075)*. Website: www.ciwmb.ca.gov.

g) *Comply with federal, State, and local statutes and regulations related to solid waste?* ***(Less-Than-Significant Impact)***

Consistent with City of Oakley recycling policy, all commercial units developed under the DTSP would provide adequate space to accommodate both trash and recycling. Implementation of the DTSP would comply with federal, State, and local statutes and regulations related to solid waste.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
XVII. MANDATORY FINDINGS OF SIGNIFICANCE.				
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?	■	❐	❐	❐
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.)	■	❐	❐	❐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	■	❐	❐	❐

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?* ***(Potentially Significant Impact)***

The DTSP site is located in the center of Oakley and although portions of the site consist of vacant fields, projects associated with the DTSP would be infill development in the middle of an urbanized area. The DTSP is located within the East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan (ECC HCP/NCCP). Therefore, development within the DTSP site would be covered under the ECC HCP/NCCP and would not significantly degrade the quality of biological resources in the area. Projects constructed under the DTSP could contribute to the degradation of water quality through storm water runoff and could adversely affect riparian wildlife species; however implementation of Mitigation Measures HYD-1, HYD-2a, and HYD-2b and would ensure that construction and post-construction runoff would not result in any significant impacts.

As is noted in Section V of this Initial Study, implementation of the DTSP could result in potentially significant impacts to cultural resources. The EIR will address potential impacts to cultural resources associated with development/redevelopment proposed under the DTSP.

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.) ***(Potentially Significant Impact)***

Development of projects under the DTSP could result in cumulatively considerable contributions to impacts in the areas of air quality, global climate change, cultural resources, noise, and traffic. Potential cumulative impacts will be addressed in the EIR.

c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly? ***(Potentially Significant Impact)***

Development/redevelopment envisioned by the DTSP could have substantial adverse effects on human beings through: placing residences in a 100-year floodplain; placing people at risk of seismic and soils hazards; exposure to hazardous materials; inadequate fire fighting equipment for taller buildings; and creating sewer infrastructure impacts. However, these potential impacts would be mitigated to a less-than-significant level through implementation of the mitigation measures recommended in this Initial Study.

Other environmental effects that could cause substantial adverse effects on humans related to air quality, global climate change, cultural resources, noise, and traffic will be addressed in the EIR.

E. REPORT PREPARERS

LSA Associates, Inc.
2215 Fifth Street
Berkeley, CA 94710

David Clore, AICP, Principal in Charge
Theresa Bravo, Project Manager
Amy Paulsen, AICP, Senior Planner
Amy Fischer, Senior Planner
Hannah Young, Planner
Tony Chung, Principal
Phil Ault, Analyst
Jennifer Morris, Word Processing
Patty Linder, Graphics Manager

157 Park Place
Point Richmond, CA 94801
Christian Gerike, Principal
Andy Pulcheon, AICP, Associate
Michael Konzak, Archeologist

F. REFERENCES AND CONTACTS

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APPENDIX C

TRANSPORTATION IMPACT ANALYSIS

Final Transportation Impact Analysis Report

City of Oakley Downtown Specific Plan

FEHR & PEERS
TRANSPORTATION CONSULTANTS

100 Pringle Ave, Suite 600
Walnut Creek, CA

Prepared for:
City of Oakley
LSA Associates

LSA

August 2009
WC06-2337

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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

This study purpose is to evaluate the off-site transportation system impacts of the proposed *City of Oakley Downtown Specific Plan* (June 2009), 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 project. The proposed project primarily consists of providing 300 new residential dwelling units and 360,000 square-feet of commercial space in Downtown Oakley. Downtown Oakley generally comprises the area surrounding Main Street (State Route 4) between Vintage Parkway, the Contra Costa Canal, and the Burlington Northern Santa Fe (BNSF) railroad. As part of the project, the Main Street Bypass will also be constructed as a four-lane arterial just north of the existing Downtown area between west of Vintage Parkway and Second Street.

REPORT ORGANIZATION

This report is divided into six chapters as described below:

- Chapter 1 – ***Introduction*** discusses the purpose and organization of this report.
- Chapter 2 – ***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 3 – ***Cumulative No Project Conditions*** describes year 2030 conditions without the proposed project
- Chapter 4 – ***Project Characteristics*** describes the proposed project and methods used to estimate its trip generation.
- Chapter 5 –***Cumulative With Project Conditions*** describes 2030 conditions with the proposed project.
- Chapter 6 – ***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 most likely be impacted by the proposed project. The location of each intersection is shown on Figure 1.

1. Oakley Road/Empire Avenue
2. Main Street/Empire Avenue
3. Main Street/Vintage Parkway
4. Main Street/Norcross Lane
5. Main Street/O'Hara Avenue
6. Main Street/Rose Avenue
7. Main Street/West Cypress Road
8. West Cypress Road/O'Hara Avenue

Downtown Oakley

FEHR & PEERS
TRANSPORTATION CONSULTANTS

July 2009
WC06-2337_1

STUDY INTERSECTION LOCATIONS

FIGURE 1

9. Main Street Bypass/Main Street, West (future)
10. Main Street Bypass/Vintage Parkway (future)
11. Main Street Bypass/Norcross Lane (future)
12. Main Street Bypass/O'Hara Avenue (future – Alternative 1 only)

For this study, the following scenarios were evaluated:

- ***Existing*** – Existing conditions based on existing traffic volumes obtained from counts and existing roadway geometries.
- ***Cumulative No Project*** – Future (Year 2030) forecast conditions based on the City of Oakley General Plan buildout and planned roadway improvements. This scenario assumes that the land uses in the study area would remain same as existing and the Main Street Bypass would not be constructed.
- ***Cumulative With Project*** – Future (Year 2030) forecast conditions with buildout of both the General Plan and the Downtown Plan. This scenario assumes that the Main Street Bypass would be constructed as a four-lane arterial.

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.

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 1
SIGNALIZED INTERSECTION LOS CRITERIA

LOS	CCTALOS Sum of Critical V/C Ratio	HCM Average Control Delay per Vehicle (seconds)	Description
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.

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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

Based on the adopted policies of CCTA and the City of Oakley, a significant traffic impact would occur if the addition of project-related traffic would cause:

- Operations of a signalized study intersection to decline from an acceptable level to an unacceptable level (service level thresholds 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,
- 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.

TABLE 3
INTERSECTION LOS THRESHOLDS

Study Location	LOS Threshold	Source
Signalized intersections along Main Street • Main Street/Empire Avenue • Main Street/Vintage Parkway • Main Street/O'Hara Avenue • Main Street/Cypress Road • Main Street Bypass/Vintage Parkway (future) • Main Street Bypass/Norcross Lane (future) • Main Street Bypass/Main Street (future)	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/Norcross Lane • Main Street/Rose Avenue • Main Street Bypass/Main Street/O'Hara Avenue (future – Alternative 2 only)	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	LOS D (Avg. Delay = 55 sec. V/C = 0.90)	City of Oakley General Plan
Unsignalized intersections on Basic Routes in Oakley • West Cypress Road/O'Hara Avenue	LOS D (Delay = 35 sec.)	City of Oakley General Plan

Source: CCTA and City of Oakley, 2007.

2. SETTING

This chapter describes the transportation system in the 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 major roadways serving the project site are described below.

Main Street (SR 4) is the major thoroughfare in the study area and is generally an east-west arterial extending from an interchange with SR 160 on the west to Brentwood and Stockton on the southeast. West of the project area, Main Street typically provides two travel lanes in each direction with a two-way center left-turn lane. Within the project area, Main Street provides one lane in each direction. Main Street has an Average Daily Traffic (ADT) volume of 26,000 vehicles west of O'Hara Avenue.[1]

O'Hara Avenue is a north-south roadway in the study area, providing connections between Main Street in Oakley and Brentwood. O'Hara Avenue is generally residential and provides one travel lane in each direction.

Empire Avenue is a major north-south roadway in the study area, providing connections between Main Street in Oakley and Brentwood. Empire Avenue typically provides two-travel lanes in each direction.

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

Vintage Parkway is a two-lane north-south residential collector west of Downtown Oakley.

BICYCLE AND PEDESTRIAN FACILITIES

Bicycle and pedestrian facilities can be classified into several general types, including:

- Class I Paths – These multi-use facilities are located off-street and can serve bicyclists, pedestrians, and sometimes equestrians. Recreational trails can be considered Class I facilities. Class I paths are typically 8 to 10 feet wide excluding shoulders and are generally paved.
- Class II Bicycle Lanes – These facilities provide a dedicated area for bicyclists within the paved street width through the use of striping and appropriate signage. These facilities are typically 4 to 6 feet wide.
- Class III Bicycle Routes – These facilities are found along streets that do not provide sufficient width for dedicated bicycle lanes. The street is then designated as a bicycle route through the use of signage informing drivers to expect bicyclists.
- Sidewalks – The exclusive realm of pedestrians, sidewalks provide pedestrian access and circulation. Sidewalks can vary in width from 5 to 20 feet; wider sidewalks are typically found in heavily urbanized and downtown areas.

Currently, limited bicycle and pedestrian facilities exist within the project study area. The nearest designated bicycle facilities are provided on Vintage Parkway, and portions of Empire Avenue and West Cypress Road. The

[1] Year 2008 data as presented on Caltrans website (www.dot.ca.gov/hq/traffops/saferesr/trafdata)

City of Oakley General Plan (adopted in December 2002), *City of Oakley Parks, Recreation and Trails Master Plan* (March 2003), and *East County Bikeway Plan* (November 2001) propose that several new bicycle facilities be constructed in the future. Within the study area, Class II bicycle lanes are planned for Main Street, O'Hara Avenue, and Rose Avenue. Also, a Class I multi-use trail is planned along the BNSF railroad tracks, which will be a part of the regional trail network to be maintained by the East Bay Regional Park District.

Sidewalks and other pedestrian amenities are provided intermittently throughout the Plan Area. Typically, narrow sidewalks are provided along the south side of Main Street and no sidewalks are provided along the north side. Within the Downtown area, crosswalks on Main Street are provided at Vintage Parkway and O'Hara Avenue. Limited pedestrian facilities and heavy truck traffic along Main Street contribute to the limited pedestrian activity in Downtown Oakley.

TRANSIT SERVICE

Tri-Delta Transit currently operates four local bus routes and two express commuter routes in the project area, as described below.[2]

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 project area located near the Main Street/Vintage Parkway and Main Street/Norcross Lane 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 and Antioch and provides service to Freedom High School in Oakley. The nearest stop to the project area is at the Main Street/Vintage Parkway intersection. This route is only in service on weekdays and provides both clockwise and counterclockwise routes. The counterclockwise route runs at approximately one-hour headways between 5:30 AM and 6:00 PM. The clockwise route runs twice during the AM peak hour period only.

Route 391, the BART/Pittsburg/Antioch/Oakley/Brentwood route, provides weekday service to most East County cities. In the project area, stops are provided at the Main Street/O'Hara Avenue intersection. The route operates from 4:00 AM to 1:15 AM on 30- to 60-minute headways.

Route 393, the Bay Point/BART/Pittsburg/Antioch/Oakley/Brentwood route, provides weekend service and mirrors weekday Route 391, with additional service to Bay Point. The route operates from 5:20 AM to 1:30 AM on 60-minute headways.

Delta Express, the express commuter bus operated 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 Lucky's (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 from the Dublin/Pleasanton BART Station at 4:34 PM and 5:49 PM. Another route, which connects to Lawrence Livermore National Lab, departs from Oakley Lucky's at 5:23 AM and 6:18 AM, with return trips leaving from the East Gate at 4:14 PM and 5:14 PM.

[2] Based on schedules posted on the Tri-Delta Transit website (www.trideltatransit.com) as of March 2009.

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 November 2008. 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 7:30 AM to 8:30 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. Figure 2 presents the existing intersection peak hour turning movements, intersection lane configurations and traffic controls.

Intersection operations were evaluated for the weekday AM and PM peak hours at the eight existing study intersections. Table 4 summarizes the analysis results using both CCTALOS and HCM. The detailed intersection LOS calculation worksheets are presented in Appendix B.

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. Oakley Road/Empire Avenue	Signal	AM PM	0.29 0.38	A A	19 23	B C
2. Main Street/Empire Avenue	Signal	AM PM	0.34 0.47	A A	18 21	B C
3. Main Street/Vintage Parkway	Signal	AM PM	0.51 0.37	A A	20 12	B B
4. Main Street/Norcross Lane	SSSC	AM PM	-- --	-- --	**64 (NB)** **>70 (NB)**	**F** **F**
5. Main Street/O'Hara Avenue	Signal	AM PM	0.51 0.51	A A	10 15	B B
6. Main Street/Rose Avenue	SSSC	AM PM	-- --	-- --	33 (NB) 30 (NB)	D D
7. West Cypress Road/Main Street	Signal	AM PM	0.50 0.34	A A	31 24	C C
8. West Cypress Road/O'Hara Avenue	AWSC	AM PM	-- --	-- --	20 16	C C

Bold indicates intersection operating at deficient level of service.

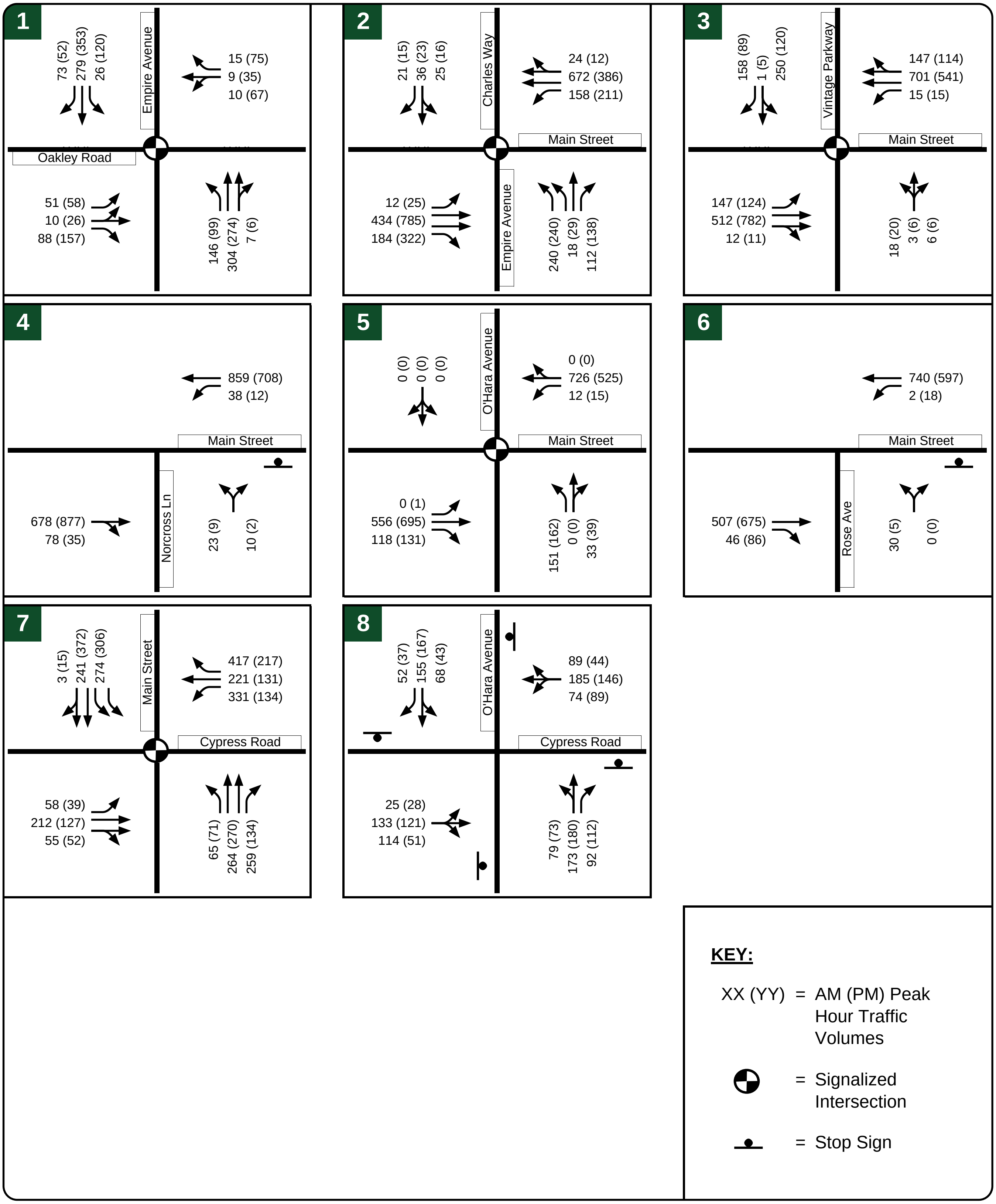
1. Signal = Signalized intersection
   SSSC = Side-street stop-controlled intersection
   AWSC = All-way stop-controlled intersection
2. Volume-to-capacity ratio (V/C) determined for all signalized intersections using the CCTALOS method.
3. Average intersection delay is calculated for all signalized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

Source: Fehr & Peers, 2009.

As shown in Table 4, most study intersections operate at acceptable levels of service based on the CCTALOS and HCM methods as compared to the LOS thresholds presented in Table 3 during both AM and PM peak hours.

Only the stop-controlled northbound approach of the Main Street/Norcross Lane intersection operates at unacceptable LOS F during both AM and PM peak hours. This is because northbound traffic on Norcross Lane must yield to the heavy eastbound and westbound traffic on Main Street. However, the number of vehicles experiencing LOS F conditions at this intersection is small, as most vehicles exiting the neighborhoods south of Main Street use the signalized Main Street/O'Hara Avenue intersection to turn left into westbound Main Street. While the Main Street/Norcross Lane intersection currently operates at an unacceptable level of service, the intersection does not have traffic volumes that satisfy MUTCD peak hour signal warrants.

The CCTALOS method can sometimes 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, LANE CONFIGURATION, AND TRAFFIC CONTROL

FIGURE 2

3. CUMULATIVE NO PROJECT CONDITIONS

This chapter discusses Cumulative (year 2030) traffic conditions based on conditions under the buildout of the City's General Plan, but without the proposed project. The roadway network and land uses within the Plan Area are assumed to be same as Existing conditions for the Cumulative No Project conditions analysis.

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:

- Widening of segment 2 of the SR 4 Bypass to a four-lane freeway between Lone Tree Way and Balfour Road with full interchanges at Sand Creek Road and Balfour Road
- 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
- Widening of Laurel Road to a four-lane arterial between Empire Avenue and Main Street

Figure 3 shows the expected lane configurations and traffic controls under Cumulative conditions.

CUMULATIVE NO PROJECT TRAFFIC VOLUME FORECASTS

Traffic volumes for Cumulative conditions include existing traffic counts and traffic from approved and planned developments in the region. These conditions represent the likely traffic levels in the year 2030, when buildout of the proposed Downtown Plan is expected. Considering the major changes in the regional roadway network and the amount of regional growth expected by 2030, the Contra Costa Transportation Authority (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 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 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 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 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*.[3] 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. However, consistent with recent studies for projects in Oakley, the amount of employment assumed for northwest area of Oakley has been reduced from the maximum envisioned under the Genera Plan to represent more realistic development intensities in that area. The reduction in employment results in 40 percent fewer jobs in Northwest Oakley than the General Plan buildout scenario (11,400 compared to 18,900); however, it would provide higher density employment in that area as compared to the ABAG *Projections 2005* (11,400 compared to 9,980 jobs).

Furthermore, no additional development beyond Existing conditions is assumed in the Downtown Area under the Cumulative No Project conditions.[4] The roadway network within the Downtown Area is also assumed to remain same as Existing conditions. Thus, the proposed Main Street Bypass would not be constructed and Main Street would continue as a two lane arterial.

Year 2030 intersection Volume Forecasts

The year 2005 and 2030 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. Figure 3 presents the forecasted Cumulative (2030) No Project AM and PM peak hour intersection volumes.

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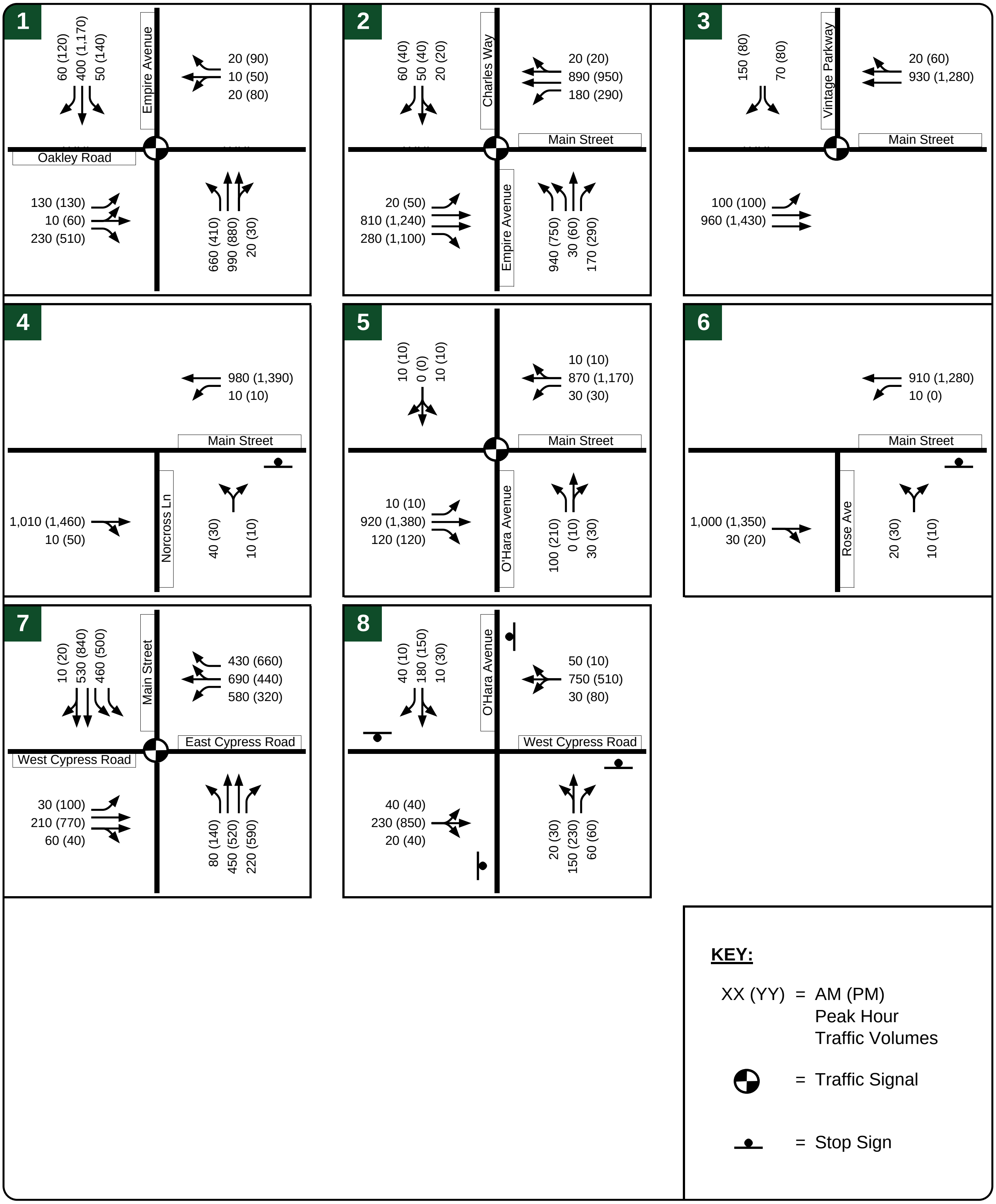
[3] The traffic volume forecasts used in this analysis were developed in early 2007 using the latest version of the CCTA Countywide Model at the time based on ABAG *Projections 2005*. A more recent version of the CCTA Model based on ABAG *Projections 2007* has been released since then. This model was compared to the model based on ABAG *Projections 2005* that was used for this analysis. Since traffic volume forecasts based on the *Projections 2005* model would result in more conservative results, the previous traffic volume forecasts developed for this project are used for the analysis.

[4] See Chapter 4 for more detail on existing and proposed land uses within the Downtown Area.



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CUMULATIVE (2030) NO PROJEC TPEAK HOUR INTERSECTION VOLUMES, LANE CONFIGURATION, AND TRAFFIC CONTROL

FIGURE 3

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Due to general growth in the region, traffic volumes in the study area are generally higher than Existing conditions. Since the Main Street Bypass would not be constructed under the Cumulative No Project scenario, and Main Street would continue as a two lane arterial, similar to existing conditions, a portion of through traffic that would potentially use Main Street would divert to SR 4 Bypass freeway, Laurel Road, West Cypress Road, and other east-west arterials and collectors. Thus, despite the projected growth in the study area, through traffic volumes along Main Street are forecast to increase by 10 to 30 percent only in comparison to existing conditions. Traffic volumes along other arterials and collectors are projected to increase commensurate with the expected growth in the area.

ANALYSIS OF CUMULATIVE NO PROJECT CONDITIONS

The Cumulative (year 2030) No Project conditions analysis was performed using the same methods as Existing conditions. Table 5 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 existing conditions. Based on the analysis, the following intersections would operate at unacceptable conditions under the Cumulative No Project conditions:

#1 The signalized Oakley Road/Empire Avenue intersection would operate at LOS F (v/c = 1.10 and delay > 100 seconds) during the PM peak hours.

#2 The signalized Main Street/Empire Avenue intersection would operate at LOS E (delay = 61 seconds) during the PM peak hours based on the HCM method. However, the intersection would operate at acceptable LOS D based on the CCTALOS method. The CCTALOS does not accurately estimate the LOS at this intersection because it does not account for the close spacing between this intersection and the adjacent Oakley Road/Empire Avenue intersection.

#4 The stop-controlled northbound approach at the side-street stop-controlled Main Street/Norcross Lane intersection would operate at LOS F (delay > 70 seconds) during both AM and PM peak hours. However, the intersection volumes would not satisfy the MUTCD peak hour signal warrant.

#5 The signalized Main Street/O'Hara Avenue intersection would operate at LOS E (v/c = 0.94 and delay = 76 seconds) during the PM peak hours.

#6 The stop-controlled northbound approach at the side-street stop-controlled Main Street/Rose Avenue intersection would operate at LOS F (delay > 70 seconds) during both AM and PM peak hours. However, the intersection volumes would not satisfy the MUTCD peak hour signal warrant.

#8 The all-way stop-controlled West Cypress Road/O'Hara Avenue intersection would operate at LOS F (delay > 70 seconds) during both AM and PM peak hours. Forecasted AM and PM peak hour intersection volumes would satisfy the MUTCD peak hour signal warrant.

TABLE 5
CUMULATIVE (2030) NO PROJECT CONDITIONS
INTERSECTION PEAK HOUR LOS SUMMARY

Intersection	Control[1]	Peak Hour	CCTALOS		HCM	
			V/C Ratio[2]	LOS	Delay[3]	LOS
1. Oakley Road/Empire Avenue	Signal	AM	0.67	B	32	C
		PM	**1.10**	**F**	**>100**	**F**
2. Main Street/Empire Avenue	Signal	AM	0.71	C	34	C
		PM	0.88	D	**61**	**E**
3. Main Street/Vintage Parkway	Signal	AM	0.65	B	9	A
		PM	0.49	A	11	B
4. Main Street/Norcross Lane	SSSC	AM	--	--	**>70 (NB)**	**F**
		PM	--	--	**>70 (NB)**	**F**
5. Main Street/O'Hara Avenue	Signal	AM	0.61	B	14	B
		PM	**0.94**	**E**	**74**	**E**
6. Main Street/Rose Avenue	SSSC	AM	--	--	**>70 (NB)**	**F**
		PM	--	--	**>70 (NB)**	**F**
7. West Cypress Road/Main Street	Signal	AM	0.73	C	43	D
		PM	0.78	C	48	D
8. West Cypress Road/O'Hara Avenue	AWSC	AM	--	--	**>70**	**F**
		PM	--	--	**>70**	**F**

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 method.
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, delay for worst approach (in seconds per vehicle) is presented.

Source: Fehr & Peers, 2007.

4. PROJECT CHARACTERISTICS

This chapter describes the proposed project, including existing and proposed land uses, and presents the assumptions and methods used to estimate project trip generation, distribution, and assignment. Since the developments proposed in the *City of Oakley Downtown Specific Plan* are not confined to a specific location and the proposed project includes the Main Street Bypass, which would change traffic patterns in the study area, the CCTA Decennial Countywide Travel Demand Model was selected as the most appropriate tool to estimate the proposed project's trip making characteristics and changes in areawide traffic patterns.

PLAN AREA

Figure 4 presents the proposed Plan Area boundary superimposed over the CCTA model traffic analysis zone (TAZ) structure in the study area. As shown on the figure, the Plan Area and the TAZ boundaries are not completely contiguous. Three TAZs are completely included in the Plan Area, and eight TAZs are partially included in the Plan Area.

EXISTING LAND USES

Table 6 presents the existing 2005 land uses in the Plan Area. Land uses were developed by interpolation between 2000 and 2010 land uses in the CCTA Model and further refined by checking against recent aerials and applying our knowledge of the local area. For the TAZs partially in the Plan Area, Table 6 only shows the land uses within the Plan Area. The CCTA model land use input for non-residential developments is the number of jobs in different categories. As shown in Table 6, the Plan Area is estimated to currently contain about 80 residential units and about 950 jobs.

PROPOSED LAND USES

Table 7 presents the additional development expected within the Plan Area as a result of the proposed plan. This is generally based on the information provided in the *Specific Plan*. However, the *Specific Plan* does not provide detailed information regarding potential development in each parcel. The *Specific Plan* provides general guidelines regarding development in the Plan Area. Thus, the information presented in Table 7 presents our interpretation of the most likely land uses that would be implemented in the Plan Area based on the proposed plan. The land use assumptions discussed below represent the most likely amount of development in the Plan Area, and not the maximum amount allowed. Existing land uses that would either be replaced by new uses or demolished as a result of the proposed Main Street Bypass are also accounted for. Our specific assumptions regarding both non-residential and residential components of the proposed project are further discussed below.

Non-Residential Land Uses

Based on the *Specific Plan*, 360,000 square feet of new commercial space would be developed in the Downtown Plan Area. The following specific developments are stated in the Specific Plan:

- ***City Hall Site*** (TAZ 30213) – The 6.9 acre site is currently occupied by the City Hall. It is estimated that an additional 26,000 square-feet of office space and about 6,500 square-feet of commercial space would be provided at this site. The site would also provide a park which is not included here.

- ***Centro Mart Frontage*** (TAZ 30203) – The site currently provides 21,000 square-feet of retail space. An additional 12,600 square-feet of retail would be provided at this site.

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TAZ STRUCTURE OF DOWNTOWN PLAN AREA

FIGURE 4

TABLE 6
DOWNTOWN OAKLEY PLAN AREA
EXISTING (2005) LAND USES

TAZ	Households			Number of Jobs					
	Single Family	Multi-Family	Total	Retail	Service	Other	Manufact-uring	Trade	Total
30190*	0	0	0	4	14	16	23	3	60
30202*	5	0	5	54	14	6	8	1	83
30203	11	0	11	38	55	7	9	2	111
30210*	0	0	0	36	45	5	7	1	94
30213*	0	0	0	0	25	25	0	0	50
30214	17	2	19	7	13	19	8	8	55
30215	0	0	0	12	12	18	7	7	56
30216*	22	8	30	6	18	40	16	16	96
30217*	15	0	15	62	78	111	45	43	339
30221*	0	0	0	0	0	0	0	0	0
30272*	0	0	0	0	0	0	0	0	0
Total	**70**	**10**	**80**	**219**	**274**	**247**	**123**	**81**	**944**

Notes:

* Indicates TAZs partially in the Downtown Oakley Plan Area. Only the land uses in the Downtown Plan Area are included in the table.

1. Land uses based on interpolation between 2000 and 2010 land uses as included in the CCTA Countywide Travel Demand Model. The land uses were checked against existing aerials and modified accordingly.

Source: Fehr & Peers, 2007.

- ***East Main Street*** (TAZ 30190 and 30272) **–** This four acre site fronting the north side of Main Street between Second Street and the Contra Costa Canal is currently occupied by a mix of industrial, retail, and other uses. Although the Specific Plan does not specify the types of developments in this site, it is assumed that the existing uses at the site would be replaced by about 62,000 square feet of retail space (assumed FAR of 0.3).

- ***Oakley Plaza*** (TAZ 30203) – The site currently provides 20,000 square-feet of retail space. An additional 35,000 square-feet of retail would be provided at this site.

- ***Main Street Triangle Site*** (TAZ 30202) – This 1.4 acre site would be bound by the proposed Main Street Bypass, Main Street, and Vintage Parkway. Although the Specific Plan does not specify the types of developments in this site, it is assumed that the existing uses at the site would be replaced by about 18,000 square feet of retail space (FAR of 0.3).

- ***Vintage Parkway Site*** (TAZ 30202) – The currently vacant site west of Vintage Parkway would be developed as 100,000 square feet of retail.

TABLE 7
DOWNTOWN OAKLEY PLAN AREA
PROPOSED LAND USES

TAZ	Households			Non-Residential							
				Size (KSF)				Number of Jobs[1]			
	Single Family	Multi-Family	Total	Retail	Office	Industrial	Total	Retail	Office	Industrial	Total
30190*	0	27	27	50	-8	-16	27	101	-30	-26	45
30202*	-5	0	-5	100	-5	-5	90	200	-20	-9	171
30203	0	24	24	57	-16	-7	35	114	-62	-11	41
30210*	3	0	3	8	0	0	8	17	0	0	17
30213*	0	0	0	6	26	0	32	12	102	0	114
30214	0	44	44	16	0	0	16	33	0	0	33
30215	0	24	24	10	0	0	10	20	0	0	20
30216*	0	63	63	28	0	0	28	57	0	0	57
30217*	0	87	87	62	0	0	62	125	0	0	125
30221*	0	20	20	14	0	0	14	29	0	0	29
30272*	0	13	13	10	0	0	10	20	0	0	20
Total	***-2***	***302***	***300***	***360***	***-2***	***-28***	***330***	***728***	***-10***	***-46***	***672***

Notes:

* Indicates TAZs partially in the Downtown Oakley Plan Area. Only the land uses in the Downtown Plan Area are included in the table.

1. Number of jobs based on 2 jobs per thousand square-feet for retail, 4 jobs per thousand square-feet for office, and 1.67 jobs per thousand square feet per thousand square-feet of industrial space

Source: Fehr & Peers, 2007.

The above sites combined would provide about 254,000 square-feet of new commercial space. Thus, under the *Specific Plan*, an additional 106,000 square feet of commercial space can be developed in the remainder of the Plan Area. As summarized in Table 7, the unassigned commercial developments were allocated to the remaining TAZs in the plan area proportional to their area and based on the allowed development guidelines. Since retail is the highest traffic generating use for these commercial areas, this analysis assumes that these unassigned commercial spaces would develop as retail.

Since the CCTA model uses employment rather than size as land use input for non-residential uses, the land uses shown in Table 7 were converted to employment consistent with land use-to-job conversion ratios in Oakley General Plan. The proposed *Specific Plan* is estimated to result in about 665 new jobs in the Plan Area.

Residential Land Uses

Based on the *Specific Plan*, 300 new residential units would be developed in the Plan Area. Although the *Specific Plan* does not identify any specific residential developments, it provides guidelines on location and intensity of the potential residential developments. Residential density of up to 45 units per acre can be provided within the Downtown Core Area (approximately corresponding to the area fronting Main Street between Vintage Parkway and Fourth Street). Residential density of 17 to 24 units per acre can be provided in the remaining parts of the Plan Area.

Since most of the Plan Area zoned for single-family development is already built, it is assumed that the majority of the new housing would be multi-family. The *Specific Plan* also allows mixed use development. Thus, the 300 new residential units were allocated to the TAZs proportionally to the TAZ area based on the guidelines in the *Specific Plan*. The estimated number of new residential units in each TAZ is summarized in Table 7.

YEAR 2030 LAND USES

Table 8 presents the expected land uses in the Plan Area in year 2030. It consists of buildout of the Plan Area as shown in Table 7 and converted to CCTA model land use categories, added to the existing land uses shown in Table 6. After the completion of the *Specific Plan* in 2030, about 375 residential units and 1,600 jobs are expected in the Plan Area. To determine the impacts of the proposed project, a Cumulative With Project conditions model was executed and compared to a Cumulative No Project conditions model. The Cumulative With Project conditions model includes the land uses summarized on Table 8 in the Plan Area, and the Cumulative No Project conditions model assumes that land uses within the Plan Area would remain same as Existing condition.

TABLE 8
DOWNTOWN OAKLEY PLAN AREA
YEAR 2030 TOTAL LAND USES[1]

TAZ	Households			Number of Jobs					
	Single Family	Multi-Family	Total	Retail	Service	Other	Manufactu-ring	Trade	Total
30190*	0	27	27	105	0	0	0	0	105
30202*	0	0	0	254	0	0	0	0	254
30203	11	24	35	152	0	0	0	0	152
30210*	3	0	3	53	45	5	7	1	111
30213*	0	0	0	12	76	76	0	0	164
30214	17	46	63	40	13	19	8	8	88
30215	0	24	24	32	12	18	7	7	76
30216*	22	71	93	63	18	40	16	16	153
30217*	15	87	102	187	78	111	45	43	464
30221*	0	20	20	29	0	0	0	0	29
30272*	0	13	13	20	0	0	0	0	20
Total	***68***	***312***	***380***	***947***	***242***	***269***	***83***	***75***	***1,616***

Notes:
* Indicates TAZs partially in the Downtown Oakley Plan Area. Only the land uses in the Downtown Plan Area are included in the table
1. Land uses consist of Downtown Plan Area land uses (Table 2) added to existing land uses (Table 6).
Source: Fehr & Peers, 2007.

TRIP GENERATION COMPARISON

The CCTA Travel Demand Model estimates that the proposed Downtown Plan would generate about 483 net new AM peak hour and 945 net new PM peak hour trips. The model estimated trip generation (which is based on number of jobs for non-residential land uses) was compared to trip generation estimated using the trip generation rates published by Institute of Transportation Engineers (ITE) in *Trip Generation* (which is based on square-feet for non-residential land uses). Table 9 compares the trip generation for the proposed Downtown Plan using the CCTA model and ITE trip generation rates. The CCTA model only includes primary trips and does not account for pass-by or diverted trips (i.e., trips already on the roadway system that make an interim stop at the site). Based on data presented in ITE *Trip Generation Handbook*, about 40 percent of trips generated by retail developments of similar size adjacent to roadways with similar volumes as Main Street are either pass-by or diverted trips. The Trip generation estimated by ITE rates was reduced by 40 percent to provide trip generation comparable to the CCTA model. Based on the ITE *Trip Generation* rates, the proposed project is estimated to generate 494 net new AM peak hour and 957 net new PM peak hour trips.

As shown in Table 9, the CCTA model generates about two percent fewer trips than estimated by ITE *Trip Generation* rates during both AM and PM peak hours. Since both ITE and the CCTA model result in similar trip generation, the trip generation estimated by the CCTA model is considered valid.

TABLE 9
TRIP GENERATION COMPARISON

Land Use[1]	Size	Trips	
		AM Peak Hour	PM Peak Hour
Single-Family Residential[2]	-2 DU	-2	-2
Multi-Family Residential[3]	302 DU	154	187
Retail[4]	360 KSF	371	1,342
Office[5]	-2 KSF	-3	-3
Industrial [6]	-28 KSF	-26	-27
Subtotal		*494*	*1,497*
40% Retail Pass-by[7]		0	-540
Net New Trips		*494*	*957*
Total Project Trip Generation as estimated by model[8]		483	945
Percent Difference		**-2%**	**-2%**

Note: DU = Dwelling Unit, KSF = one thousand square feet.

1. Land uses based on net changes in land use as summarized in Table 7.
2. Trip generation determined from average rates for Single-Family Detached Housing (Land Use Code 210) in ITE *Trip Generation* (8th Edition) as presented below:
   AM Peak Hour: 0.75 trips per DU PM Peak Hour: 1.01 trips per DU
3. Trip generation determined from average rates for Apartments (Land Use Code 220) in ITE *Trip Generation* (8th Edition) as presented below:
   AM Peak Hour: 0.51 trips per DU PM Peak Hour: 0.62 trips per DU
4. Trip generation determined from average rates for Shopping Center (Land Use Code 820) in ITE *Trip Generation* (8th Edition) as presented below:
   AM Peak Hour: 1.00 trips per KSF PM Peak Hour: 3.73 trips per KSF
5. Trip generation determined from average rates for Office (Land Use Code 710) in ITE *Trip Generation* (8th Edition) as presented below:
   AM Peak Hour: 1.55 trips per KSF PM Peak Hour: 1.49 trips per KSF
6. Trip generation determined from average rates for General Light Industrial (Land Use Code 110) in ITE *Trip Generation* (8th Edition) as presented below:
   AM Peak Hour: 0.92 trips per KSF PM Peak Hour: 0.97 trips per KSF
7. Pass-by reduction based on average pass-by trip percentage for Shopping Center (ITE Land Use Code 820) in ITE *Trip Generation Handbook (Second Edition).*
8. Net new trips generated by the proposed project as estimated by the CCTA Travel Demand Model.

Source: Fehr and Peers, 2009

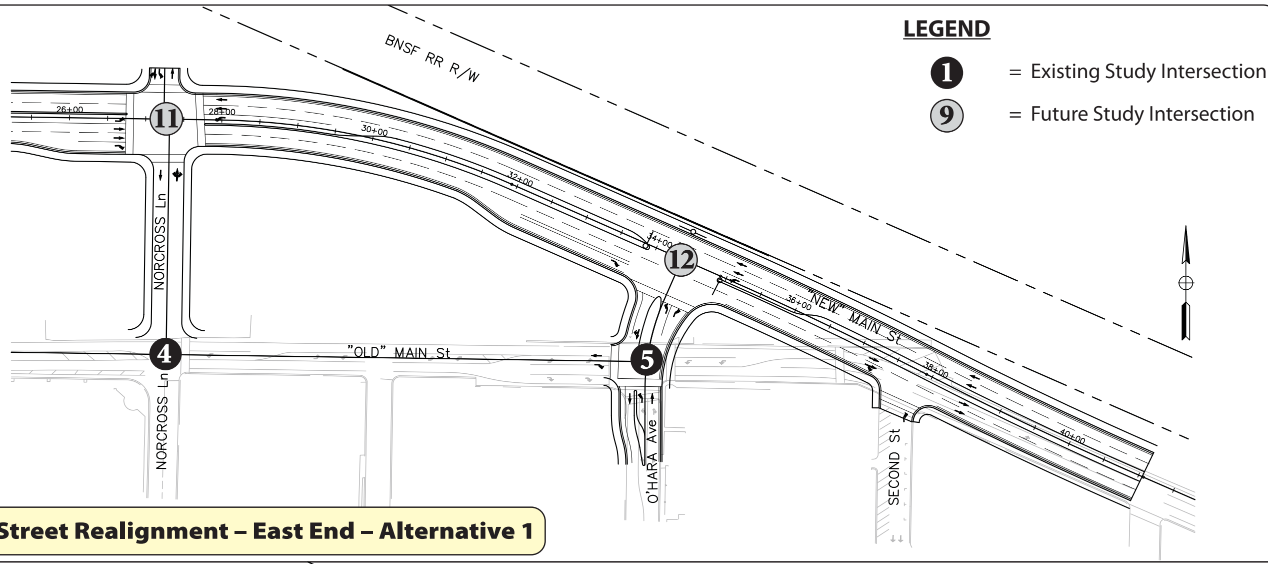
PLAN AREA ROADWAY NETWORK

Based on the *Downtown Plan*, the following roadway network modifications are assumed as part of the proposed project.

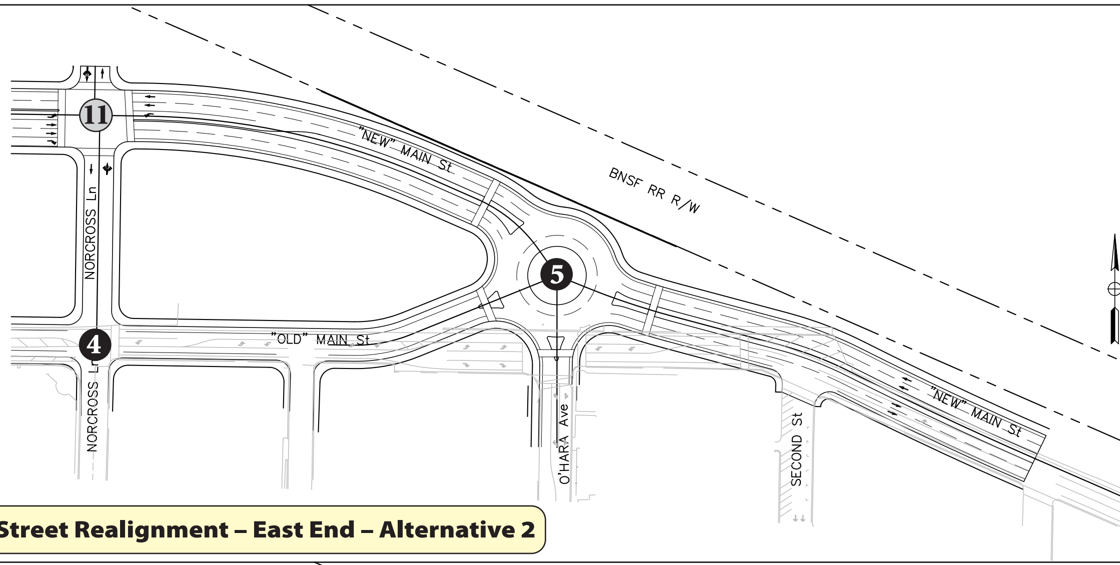
- Construction of the Main Street Bypass as a four-lane arterial north of the existing Main Street between west of Vintage Parkway and O'Hara Avenue. The proposed Main Street Bypass would intersect existing Vintage Parkway. Norcross Lane would be extended north to intersect the new Main Street Bypass (See Figure 1).
- The following three alternatives, as shown on Figure 5, are proposed for the eastern intersection of the Main Street Bypass with Main Street:
    - Alternative 1 would extend O'Hara Avenue to the Main Street Bypass to create a new signalized intersection. The existing segment of Main Street between O'Hara Avenue and Second Street would also be eliminated.
    - Alternative 2 would create a four-approach, two-lane roundabout with the Main Street Bypass comprising the northwestern and eastern approaches, Main Street comprising the southwestern approach, and O'Hara Avenue comprising the southern approach.
    - Alternative 3 would create a four approach, signalized intersection with the Main Street Bypass, Main Street, and O'Hara Avenue.
- The newly created intersections along the Main Street Bypass at Main Street (western end), Vintage Parkway, and Norcross Lane would be signalized.
- The existing Main Street would remain a two-lane arterial and would be modified to be more pedestrian oriented. As a result, the existing Main Street/Vintage Parkway and Main Street/Norcross Lane intersections would be converted to all-way stop-control.[5]

The Main Street Bypass is included in the Cumulative With Project conditions model runs to determine their effects on areawide traffic patterns.

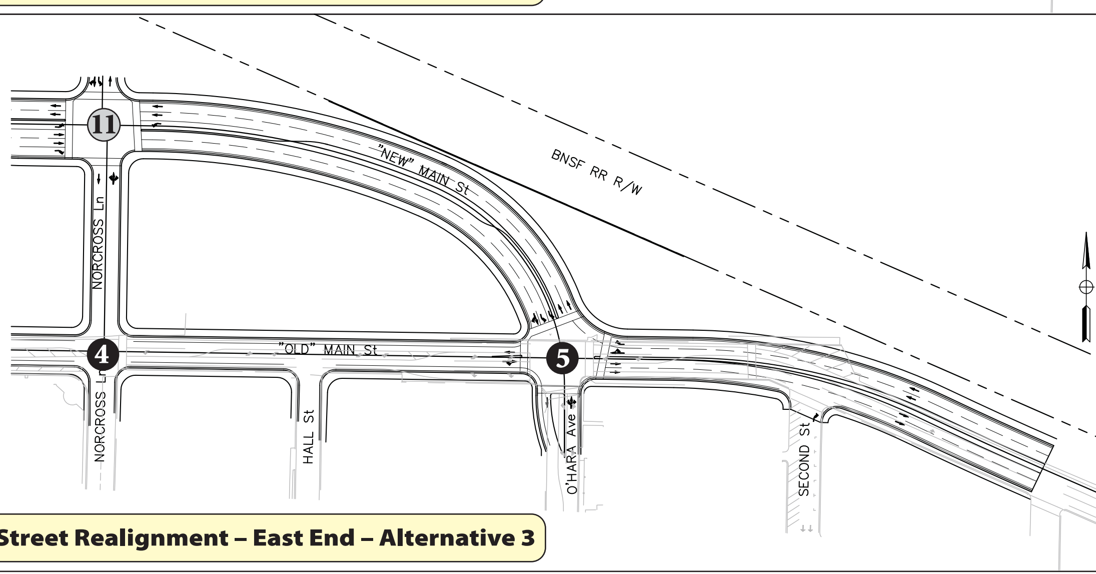
[5] *The Downtown Specific Plan* shows the Main Street/Vintage Parkway and Main Street/O'Hara Avenue intersections as remaining signalized. However, it is recommended that these intersections be converted to all-way stop-controlled to maintain the proposed pedestrian orientation of Main Street within the Downtown area. See Chapter 6 for more detail.



Main Street Realignment – East End – Alternative 1



Main Street Realignment – East End – Alternative 2



Main Street Realignment – East End – Alternative 3

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MAIN STREET REALIGNMENT ALTERNATIVES

FIGURE 5

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5. CUMULATIVE WITH PROJECT TRAFFIC CONDITIONS

This chapter discusses Cumulative (year 2030) traffic conditions based on conditions under the buildout of the City's General Plan, with the build-out of the proposed project. The roadway network and land uses within the Plan Area are consistent with the proposed *Downtown Plan* as described in the previous chapter.

CUMULATIVE WITH PROJECT TRAFFIC FORECASTS

Similar to the Cumulative No Project conditions, the CCTA Decennial Countywide Travel Demand Model was used to forecast Cumulative With Project AM and PM peak hour intersection volumes. The 2030 land uses were modified to include the project land uses as shown in Table 8. In addition, the 2030 roadway network was modified to include the roadway improvements described in the previous chapter. 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.

The Cumulative With Project AM and PM peak hour intersection volumes are presented on Figure 5. In comparison to the Cumulative No Project conditions volumes, the completion of the Main Street Bypass results in an increase in through traffic along Main Street, and a decrease in traffic on other parallel roadways such as West Cypress Road and Laurel Road. Additional traffic generated by the proposed Downtown Plan would also contribute to the increase in traffic volumes in the study area. Since the current Main Street would be modified to be more pedestrian friendly, it is expected that it would mostly serve local traffic with minimal through traffic.

CUMULATIVE WITH PROJECT CONDITIONS

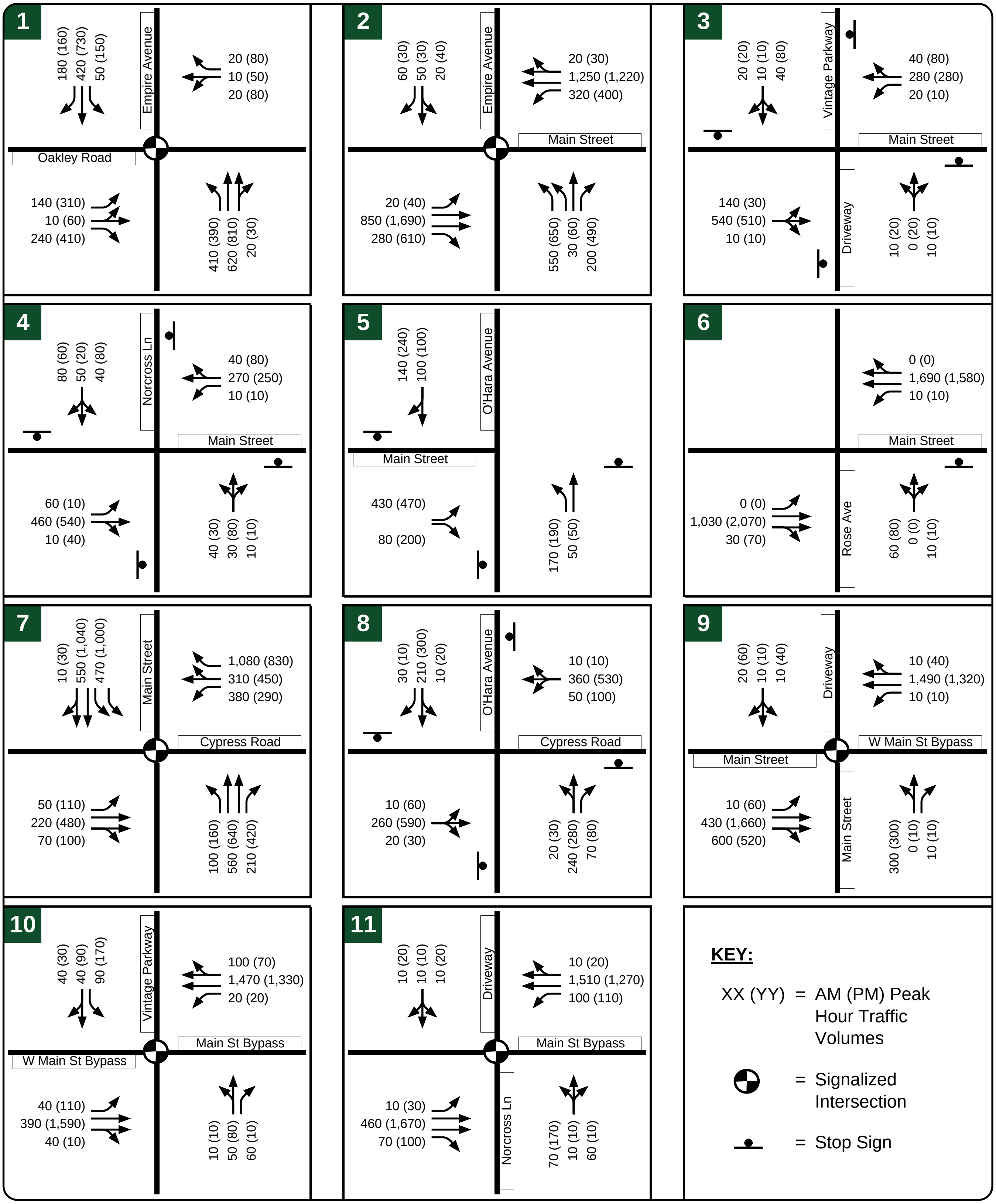
Table 10 summarizes the intersection LOS analysis results of the Cumulative With Project conditions. Tables 11 and 12 summarize the LOS analysis for the three Main Street east end alignment alternatives using CCTALOS and HCM methods. Appendix B contains the LOS calculation worksheets. Based on thresholds presented in Table 3, the following study intersections would operate at unacceptable service levels under Cumulative With Project conditions.

#1 The signalized Oakley Road/Empire Avenue intersection would operate at unacceptable LOS E during the PM peak hour (delay = 62 seconds based on HCM). The intersection would improve from LOS F (delay > 100 seconds) during the PM peak hour under Cumulative No Project conditions. Since the proposed project would reduce delay and improve traffic operations, the proposed project would not cause a significant impact at the Oakley Road/Empire Avenue intersection.

#2 The signalized Main Street/Empire Avenue intersection would operate at unacceptable LOS F during the PM peak hour (v/c = 1.01 based on CCTALOS and delay = 82 seconds based on HCM). The intersection would degrade from LOS E (delay = 61 seconds) under Cumulative No Project conditions.

#5 The proposed roundabout at the Main Street/Main Street Bypass/O'Hara Avenue intersection under Alternative 2 would operate at unacceptable LOS F during the PM peak hour (delay > 120 seconds) under Cumulative With Project conditions.

#6 The stop-controlled northbound approach at the side-street stop-controlled Main Street/Rose Avenue intersection would continue to operate at LOS F (delay > 70 seconds) during both AM and PM peak hours. Since the intersection volumes would not satisfy the MUTCD peak hour signal warrant, the proposed project would not cause a significant impact at the Main Street/Rose Avenue intersection.



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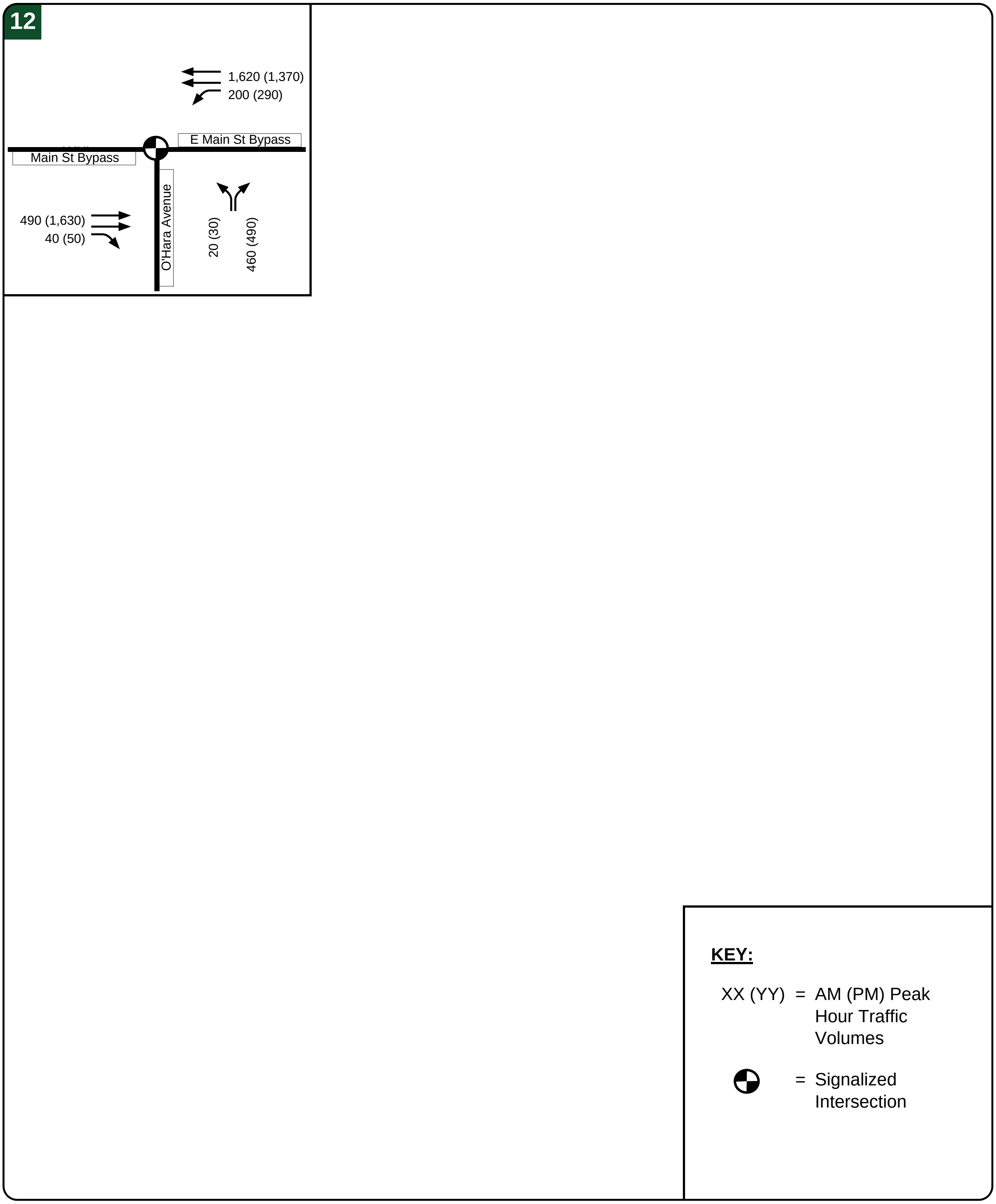
CUMULATIVE PLUS PROJECT PEAK HOUR INTERSECTION VOLUMES, LANE CONFIGURATION, AND TRAFFIC CONTROL

FIGURE 6a



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CUMULATIVE PLUS PROJECT PEAK HOUR INTERSECTION VOLUMES, LANE CONFIGURATION, AND TRAFFIC CONTROL

FIGURE 6a

TABLE 10
CUMULATIVE (2030) WITH PROJECT CONDITIONS
INTERSECTION PEAK HOUR LOS SUMMARY

Intersection	Control[1]	Peak Hour	CCTALOS		HCM	
			V/C Ratio[2]	LOS	Delay[3]	LOS
1. Oakley Road/Empire Avenue	Signal	AM PM	0.57 0.88	A D	25 **62**	C **E**
2. Main Street/Empire Avenue	Signal	AM PM	0.68 **1.01**	B **F**	32 **82**	C **F**
3. Main Street/Vintage Parkway	AWSC	AM PM	-- --	-- --	31 19	C C
4. Main Street/Norcross Lane	AWSC	AM PM	-- --	-- --	20 33	C D
5. Main Street/O'Hara Avenue	Varies	AM PM	See Table 11		See Table 12	
6. Main Street/Rose Avenue	SSSC	AM PM	-- --	-- --	**>70 (NB)** **>70 (NB)**	**F** **F**
7. West Cypress Road/Main Street	Signal	AM PM	0.73 0.88	C C	48 52	D D
8. West Cypress Road/O'Hara Avenue	AWSC	AM PM	-- --	-- --	27 **>70**	D **F**
9. Main Street/Main Street Bypass (West)	Signal	AM PM	0.64 0.66	A B	22 28	C C
10. Main Street Bypass/ Vintage Parkway	Signal	AM PM	0.59 0.62	A B	19 25	B C
11. Main Street Bypass/ Norcross Lane	Signal	AM PM	0.50 0.67	A A	11 26	B C
12. Main Street Bypass/ O'Hara Avenue	Varies	AM PM	See Table 11		See Table 12	

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 method.
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, delay for worst approach (in seconds per vehicle) is presented.

Source: Fehr & Peers, 2009.

TABLE 11
MAIN STREET EAST END ALIGNMENT ALTERNARTIVE
CUMULATIVE (2030) WITH PROJECT CONDITIONS
CCTALOS LOS ANALYSIS SUMMARY

Intersection	Control[1]	Peak Hour	Alternative 1		Alternative 2		Alternative 3	
			V/C Ratio[2]	LOS	V/C Ratio[2]	LOS	V/C Ratio[2]	LOS
5. Main Street / O'Hara Avenue	AWSC/ Round/ Signal[3]	AM PM	- -	- -	- -	- -	0.66 0.83	C D
12. Main Street Bypass / O'Hara Avenue	Signal	AM PM	0.59 0.73	A C				

1. Signal = Signalized intersection
   AWSC = All-way stop-controlled intersection
   Round = Roundabout intersection
2. Volume-to-capacity ratio (V/C) determined for all signalized intersections using the CCTALOS method.
3. The intersection is all-way stop-controlled under Alternative 1, a roundabout under Alternative 2, and signalized under Alternative 3. The two intersections are combined under Alternatives 2 and 3.

Source: Fehr & Peers, 2009.

TABLE 12
MAIN STREET EAST END ALIGNMENT ALTERNARTIVE
CUMULATIVE (2030) WITH PROJECT CONDITIONS
HCM LOS ANALYSIS SUMMARY

Intersection	Control[1]	Peak Hour	Alternative 1		Alternative 2		Alternative 3	
			Delay[2]	LOS	Delay[3]	LOS	Delay[2]	LOS
5. Main Street / O'Hara Avenue	AWSC/ Round/ Signal[4]	AM PM	19 27	C D	13 **>120**	B **F**	21 34	C C
12. Main Street Bypass / O'Hara Avenue	Signal	AM PM	11 31	B C				

Bold indicates intersection operating at deficient level of service.

1. Signal = Signalized intersection
   AWSC = All-way stop-controlled intersection
   Round = Roundabout intersection
2. 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, delay for worst approach (in seconds per vehicle) is presented.
3. Average delay for roundabout as calculated by SIDRA.
4. The intersection is all-way stop-controlled under Alternative 1, a roundabout under Alternative 2, and signalized under Alternative 3. The two intersections are combined under Alternatives 2 and 3.

Source: Fehr & Peers, 2009.

#8 The all-way stop-controlled West Cypress Road/O'Hara Avenue intersection would continue to operate at unacceptable LOS F (delay > 70 seconds) during the PM peak hour. The intersection would satisfy the MUTCD peak hour signal warrant under the Cumulative With Project conditions.

The other study intersections would operate at LOS D or better during both AM and PM peak hours under Cumulative with Project conditions.

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 traffic generated by the proposed Downtown Plan would cause the signalized Main Street/Empire Avenue intersection (#2) to operate at unacceptable LOS F 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 = 0.88) based on the CCTALOS method and at unacceptable LOS E (delay = 61 seconds) during the PM peak hour under Cumulative No Project conditions. Traffic generated by the projects developed within the Downtown area would cause the intersection to operate at an unacceptable LOS F (v/c = 1.01 and delay = 82 seconds) during the PM peak hour.

MITIGATION MEASURE 1: Mitigation of the unacceptable conditions at Main Street/Empire Avenue intersection can 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. Projects developed as part of the Downtown Plan shall contribute to this mitigation by paying their 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 = 0.90) based on the CCTALOS method and LOS D (delay = 50 seconds) based on the HCM method 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 traffic generated by the proposed Downtown Plan at West Cypress Road/O'Hara Avenue (#8) intersection would contribute to the unacceptable LOS F conditions during the PM peak hour, causing a significant impact under Cumulative With Project conditions.

ANALYSIS: The all-way stop-controlled intersection would operate at unacceptable LOS F (delay > 70 seconds) during the PM peak hour regardless of the proposed Downtown Plan. Traffic generated by the projects developed within the Downtown area would contribute to the unacceptable conditions by adding traffic to the intersection.

MITIGATION MEASURE 2 Mitigation of the unacceptable conditions at West Cypress Road/O'Hara Avenue intersection can be achieved through the installation of traffic signals at the intersection. The forecasted AM peak hour and PM peak hour intersection volumes would satisfy the MUTCD peak hour traffic signal warrants.[6] This signal installation is included in the City's Transportation Impact Fee Program. Projects developed as part of the Downtown Plan would contribute to this mitigation by paying their fair share of the cost through the payment of the City's Transportation Impact Fee.

The West Cypress Road/O'Hara Avenue intersection would operate at LOS B (v/c = 0.67) based on the CCTALOS method and LOS C (delay = 31 seconds) based on the HCM method 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 proposed roundabout at the Main Street/Main Street Bypass/O'Hara Avenue intersection under Alternative 2 would operate at unacceptable LOS F conditions during the PM peak hour under Cumulative With Project conditions.

ANALYSIS: The roundabout intersection would operate at unacceptable LOS F (delay > 120 seconds) during the PM peak hour. The relatively high traffic volumes along Main Street Bypass would provide few gaps for vehicles on the O'Hara Avenue and Main Street approaches of the intersection to turn into Main Street Bypass.

[6] 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.

Traffic generated by the projects developed within the Downtown area would also contribute to the unacceptable conditions by adding traffic to the intersection.

MITIGATION MEASURE 3 Mitigation of unacceptable conditions at the Main Street/Main Street Bypass/ O'Hara Avenue intersection can be achieved by selecting either Alternative 1 or Alternative 3. if Alternative 2 is selected, the impact would remain **significant and unavoidable**.

CUMULATIVE WITH PROJECT MITIGATED CONDITIONS

The study intersections would operate at acceptable conditions with the implementation of the recommended mitigation measures outlined in the previous section, with the exception of the Main Street Bypass/Main Street/O'Hara Avenue intersection under Alternative 2. Table 13 summarizes the intersection LOS at the study intersection after the implementation of the recommended improvements.

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

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
1. Oakley Road/Empire Avenue	Signal	AM	0.57	A	25	C	0.50	A	23	C
		PM	0.88	D	**62**	**E**	0.71	C	40	D
2. Main Street/Empire Avenue	Signal	AM	0.68	B	32	C	0.62	B	27	C
		PM	1.01	F	**82**	**F**	0.90	D	50	D
8. West Cypress Road/ O'Hara Avenue	AWSC	AM	--	--	27	D	0.42	A	19	B
		PM	--	--	**>70**	**F**	0.67	B	31	C

Bold indicates intersection operating at deficient level of service.

1. Signal = Signalized intersection
   AWSC = All-way stop-controlled intersection
2. Volume-to-capacity ratio (V/C) determined for all signalized intersections using the CCTALOS method.
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, delay for worst approach (in seconds per vehicle) is presented.

Source: Fehr & Peers, 2009.

6. ACCESS, CIRCULATION, AND PARKING

This chapter evaluates access and circulation for vehicles, pedestrians, bicycles, transit, and emergency vehicles, and parking with the proposed Downtown Plan. The proposed Plan does not include detailed information about the projects that would be developed as part of the Downtown Plan and the proposed Main Street Bypass is still in preliminary planning stages. Therefore, this evaluation is provided at a general level and is based on the design and development guidelines provided in the *City of Oakley Downtown Specific Plan,* dated June 2009.

ACCESS AND CIRCULATION

Access and circulation for vehicles, pedestrians, bicycles, transit, emergency vehicles, and trucks is discussed in this section. The Circulation Element of the *City of Oakley General Plan* and the *Oakley Long Range Roadway Plan* (LRRP) provide general roadway design guidelines, but not rigid design standards. The proposed transportation circulation system in the Downtown Plan is generally consistent with these guidelines. The recommended design features described in the Downtown Plan that are not consistent with these guidelines are also discussed in this section.

Vehicles

As shown on Figure 1, Main Street is a major arterial in the Downtown area and provides vehicular access and circulation through the Downtown area. The Main Street Bypass would be constructed just north of the Downtown core area, providing additional roadway capacity for through traffic and lessening traffic congestion on Main Street. Other side streets provide access to and from uses within the Downtown area. Planned roadway improvements for components of the vehicular circulation system in the Downtown area are discussed below.

<u>Main Street Bypass</u>

The Downtown Plan proposes the construction of the Main Street Bypass to divert the heavy through and truck traffic away from Main Street in the Downtown area providing for more efficient through traffic circulation on Main Street Bypass and creating a pedestrian friendly environment on Main Street. The proposed Main Street Bypass would be constructed north of Main Street as a four lane arterial with a center median/left-turn lane, no parking lanes, and landscaping, and sidewalks on both sides of the roadway. The Main Street Bypass would intersect Main Street about midway between Gardenia Street and Vintage Parkway in the west. Three roadway alternatives, as shown on Figure 5, are proposed for the east end of Plan Area. Norcross Lane would also be extended further north to intersect Main Street Bypass. Based on preliminary design, the intersections of Main Street Bypass at west end of Main Street, Vintage Parkway, Norcross Lane, and east end of Main Street depending on the alternative would be signalized. Adjacent commercial developments would have direct vehicular access on Main Street Bypass. The number of these driveways should be minimized and they should be limited to right-in/right-out movements only.

<u>Main Street within the Downtown Core</u>

Since the Main Street Bypass is projected to provide adequate capacity to serve the forecasted through-traffic demand, the existing Main Street can be redesigned to create a pedestrian-scale street. The Downtown Plan recommends interim improvements on Main Street prior to the completion of the Main Street Bypass, and ultimate improvements after the completion of the Main Street Bypass. Currently, Main Street does not have a uniform roadway width in the Downtown area; the roadway has intermittent curbs, gutters and sidewalks of various widths, and a combination of parallel or head-in parking in various sections.

In the interim condition, Main Street would be redesigned to provide a uniform cross-section while continuing to accommodate through traffic, including heavy trucks. Thus, to the extent feasible, curbs, gutters and 12-foot sidewalks will be constructed without interfering with through traffic on Main Street. Main Street would provide a consistent curb-to-curb width of 62 feet to accommodate one 15-foot travel lane and an eight-foot parking lane in each direction, with a 16-foot turn-lane/center median. This cross-section cannot be implemented on certain sections of Main Street because of existing buildings. These sections would retain the current cross-section until the completion of the Main Street Bypass. The Downtown Plan also recommends construction of corner bulb-outs at all intersections in the Downtown area. The corner bulb-out and other design features may interfere with through truck circulation. Thus, the interim design of Main Street should be reviewed to ensure that the roadway would provide adequate truck circulation through Downtown.

In the ultimate conditions, Main Street would continue to provide a 62-foot curb-to-curb width. Travel lanes would be narrowed to 14 feet and the center median would be widened to 18 feet to provide additional landscaping. Main Street would accommodate corner bulb-outs at all intersection corners within the Downtown core.

Since the Main Street Bypass would provide adequate capacity for through traffic in the corridor, the existing Main Street would only need to accommodate traffic generated by the Downtown area and adjacent neighborhoods. Based on preliminary analysis summarized in the previous chapter, the existing signals at Main Street/Vintage Parkway and Main Street/O'Hara Avenue intersections would no longer be needed. Thus, it is recommended that both intersections be converted to all-way stop-controlled intersections after the completion of the Main Street Bypass.

<u>Main Street East</u>

Main Street East consists of the section of Main Street just east of the Main Street Bypass. This section of Main Street currently provides one travel lane in each direction but would need to be widened to provide two travel lanes in each direction to accommodate forecasted through traffic, including trucks. The Downtown Plan provides for widening Main Street to provide a curb-to-curb width of 62 feet to accommodate two 11-foot travel lanes in each direction, with a 10-foot center median/left turn lane, and an eight foot parking lane on south side of the roadway. The LRRP identifies this section of Main Street as a four-lane commercial arterial, and recommends an 88-foot curb-to-curb width that accommodates parking and bicycle lanes on both sides of the street. This recommended width cannot be provided because the south frontage of the roadway has already been built and further widening of the roadway would preclude future development on the north side of the roadway. Since Main Street would continue to serve as a major truck route and is identified as a future bicycle facility, it is recommended that the proposed parking lane be eliminated to provide wider outer lanes in both directions to better accommodate trucks and bicycles.

<u>Downtown Side Streets</u>

The side-streets within the Downtown area, including Norcross Lane, Hall Street, Second Street, Third Street, and Acme Street, provide local access and circulation to the uses in the Downtown area. The Downtown Plan recommends various streetscape improvements on these roadways. Generally, these side streets would provide one travel lane in each direction, with either parallel or angled parking with improvements such as sidewalks, crosswalks, and corner bulb-outs to enhance the pedestrian circulation.

Pedestrian

The proposed Downtown Plan would create a pedestrian friendly downtown environment by enhancing pedestrian access and circulation. Specific design elements of the Downtown Plan include widening existing sidewalks, and providing new sidewalks, crosswalks, and median refuges; constructing corner bulb-outs to shorten walking distance across intersections; minimizing driveway curb-cuts to reduce vehicle/pedestrian conflicts; and providing additional pedestrian amenities such as landscaping, pedestrian-scale lighting, and fronting commercial developments.

Bicycle Circulation

As stated in Chapter 2, bicycle facilities are planned for O'Hara Avenue and Main Street. Based on design guidelines presented in the Downtown Plan, Class II (signed and striped bicycle lanes) can be accommodated on Main Street Bypass and O'Hara Avenue, and Class III (signed bicycle routes) can be accommodated on Main Street within the Downtown core area, but bicycle facilities can not be accommodated on Main Street, east of the Main Street Bypass. However, the previous recommendation to eliminate on-street parking on the south side of Main Street to accommodate wider travel lanes would allow Class III facilities on this portion of Main Street.

Transit Access

Tri-Delta Transit operates several bus routes on Main Street, Vintage Parkway, and O'Hara Avenue through the Downtown area. Currently, minimal transit amenities, such as bus pullouts or shelters are provided, and pedestrian access to transit can be difficult due to lack of adequate sidewalks. The design for the new Main Street Bypass and planned improvements on Main Street should be coordinated with Tri-Delta Transit to determine the appropriate location for bus pullouts and appropriate bus amenities such as shelters on Main Street. Pedestrian facilities connecting the transit stops and major destinations should be provided. The proposed project would improve pedestrian access to transit by providing new sidewalks and enhancing existing sidewalks.

Emergency Access

Factors such as number of access points, roadway width, and proximity to fire stations determine if a site provides sufficient emergency access. Multiple roadways provide access to and from the Downtown area. If one of these roadways is blocked or obstructed, an emergency vehicle could use an alternate route to access the area. As part of the Downtown Plan, the vehicle travel widths on many roadways within the Downtown area may be narrowed to provide sidewalks, on-street parking, medians, or corner bulb-outs. Improvement plans for each roadway should be reviewed to ensure that adequate width and turning radius is maintained on all roadways. Also, site plans for individual developments should be reviewed to ensure adequate emergency access. The project site is located in the East Contra Costa Fire Protection District and the nearest fire station is located on Second Street, just south of the Plan Area. 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 City of Oakley General Plan identifies Main Street as a truck route. Although the number of heavy trucks on Main Street in expected to decrease in the near future after the completion of the SR 4 Bypass freeway, Main Street would continue to function as a major truck route providing truck access for the City of Oakley and adjacent communities. The proposed interim design for Main Street within the Downtown core area prior to completion of the Main Street Bypass would continue to accommodate trucks. Through truck traffic on this portion of Main Street would be prohibited after the completion of the Main Street Bypass, as Main Street Bypass would accommodate all through truck traffic. As previously mentioned, it is recommended that the outside lanes on Main Street, east of the Main Street Bypass, be widened to better accommodate trucks.

Since the new developments in the proposed Downtown Plan would primarily consist of smaller commercial projects, most deliveries are expected in smaller delivery vehicles. Deliveries in larger semi-trucks are expected to be minimal. To the extent possible, large semi-truck deliveries should be scheduled for off-peak periods to minimize conflicts between delivery trucks and passenger vehicles. The site plan for specific development projects within the Downtown Plan area should be reviewed to ensure adequate truck access at project driveways and circulation within the project sites.

PARKING

Public parking within the downtown area is limited to roughly 100 unmarked, curbside spaces along the neighborhood streets south of Main Street (SR 4). While the supply of parking, both public and private off-street, is adequate for the current level of development, the plan recommends a significant increase in the amount public parking to provide for and encourage new development. The Plan establishes a Downtown Parking District, whose boundaries mirror those of the Downtown Core Area and includes the following potential new public parking facilities:

- 350 stalls north of Main Street in public parking lots and on-street parking
- 110 curbside parking spaces along Main Street
- Either a 65 space surface parking lot or a 210 space three-level structure at the existing fire station site, located at the intersection of Acme Street and 2nd Street

The proposed Downtown Plan stipulates that each development provide adequate parking off-street or participate in an in-lieu parking program to be established by the City. The program would allow the City to waive or reduce the off-street parking requirement for commercial developments, and instead collect an in-lieu fee to construct and operate the required parking spaces in shared facilities in the Downtown area.

Shared parking is defined as use of a parking space to serve two or more individual uses without conflict or encroachment. Shared parking could occur if various uses have peak parking demands at different times or on different days, which would allow drivers for one use to park in a space that would later be used by drivers accessing the other use. Shared parking can also be used when drivers can visit various uses while parked at the same location and do not need to drive between different uses. Many central business districts and downtowns provide central shared parking facilities to reduce the overall parking supply needed in the area. Thus, the in-lieu parking program would allow higher densities of commercial development and reduce the overall parking supply in the Downtown area because the shared parking facilities would satisfy the overall parking demand, and individual developments would not necessarily need to satisfy their own individual peak parking demand.

The Downtown Plan recommends the following minimum parking requirements for new development:

- Three parking spaces per 1,000 square feet for non-residential uses in the Downtown Core Area and Residential/Commercial Conversion Opportunity Areas. Curbside on-street parking maybe counted towards these requirements.
- Four parking spaces per 1,000 square feet for first floor non-residential and 3 parking spaces per 1,000 square feet for upper floor spaces in the Downtown Support Area.
- For multi-family dwelling units in both the Downtown Core Area and Downtown Support Area, one space will be required for one or two bedroom units, with each additional bedroom requiring 0.5 spaces.
- For single-family dwelling units in both the Downtown Core Area and Downtown Support Area, one space will be required for one or two bedroom units, with three bedrooms requiring one additional space.

These parking requirements are lower than typical suburban parking requirements. Since the Downtown area is expected to provide a variety of retail and commercial uses in a walkable environment, it is expected to have lower parking demand than typical suburban shopping centers due to the potential for shared parking between the developments. To reduce the parking supply needed in the Downtown area, it is recommended that all non-residential parking be accessible to all users and not reserved for specific developments.

Since the specific projects that would be developed in the Downtown area are not known at this time, their parking demand can not be estimated. As development applications in the Downtown area are submitted, their incremental parking demand over parking demand at the time should be estimated to ensure that adequate overall parking supply is provided through the Downtown area.

Bicycle Parking

The Downtown Plan does not identify any locations for bicycle parking. Although no formal bicycle parking requirement exists, it is recommended that bicycle parking in the form of secure bicycle racks be provided throughout the Downtown area to accommodate residents and commercial employees and customers who would bicycle to the site and to encourage alternative transportation modes.

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:

Policy 2.8.2 The downtown area should be developed at a pedestrian scale, with adequate sidewalks, street crossings, and pedestrian resources.

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.

The proposed Specific Plan, enhanced by the recommendations in the previous sections 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 causes 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 design guidelines provided in the proposed the *City of Oakley Downtown Specific Plan* would not result in a significant impact. The implementation of the Specific Plan would include applications of the design guidelines to individual development projects. Impact and Mitigation Measure 4 are identified to ensure that these guidelines are followed and to avoid potential significant impacts by each individual project.

IMPACT 4: The design of the specific development projects and roadways developed under the Specific Plan 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 4: Mitigation of the potential impact can be achieved through a review of the final design of the specific development projects and roadways by the City Engineer to ensure the adequacy of the design. The following items should be reviewed as the Downtown area continues to develop:

A. The number of driveways on Main Street Bypass should be minimized. These driveways should be limited to right-in/right-out movements only.

B. The interim improvements on Main Street, prior to the completion of the Main Street Bypass, should be reviewed to ensure that Main Street will continue to accommodate heavy trucks.

C. The currently signalized Main Street/Vintage Parkway and Main Street/ O'Hara Avenue intersections should be converted to all-way stop-controlled intersections after the completion of the Main Street Bypass.

D. The design of Main Street, east of the Main Street Bypass should be reconsidered to better accommodate trucks and bicycles. It is recommended that the proposed parking lane on the south side of the roadway be eliminate to widen the outside travel lanes.

E. The design of Downtown roadways should be coordinated with Tri-Delta Transit to determine the location for 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 destinations in the Plan area.

F. Roadways within the Downtown area should provide adequate width and turning radii for emergency access vehicles.

G. Development projects within the Downtown Area should be evaluated and approved only if they provide adequate emergency access.

H. Development projects within the Downtown area should be evaluated and approved only if they provide adequate truck access and circulation.

I. To the extent feasible, non-residential parking should be accessible to all users and not reserved for specific development projects.

J. The incremental parking demand for each development project should be estimated and compared to the overall parking supply to ensure adequate parking supply in the Downtown area.

K. Bicycle parking should be evaluated and development projects approved only if they provide adequate bicycle parking facilities provided throughout the Downtown area.

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

APPENDIX A:
TRAFFIC COUNTS

MARKS TRAFFIC DATA

CITY OF OAKLEY

fp
Mietek 916-806-0250

File Name : empire-main-a
Site Code : 2
Start Date : 11/19/2008
Page No : 1

Groups Printed- Vehicles Only

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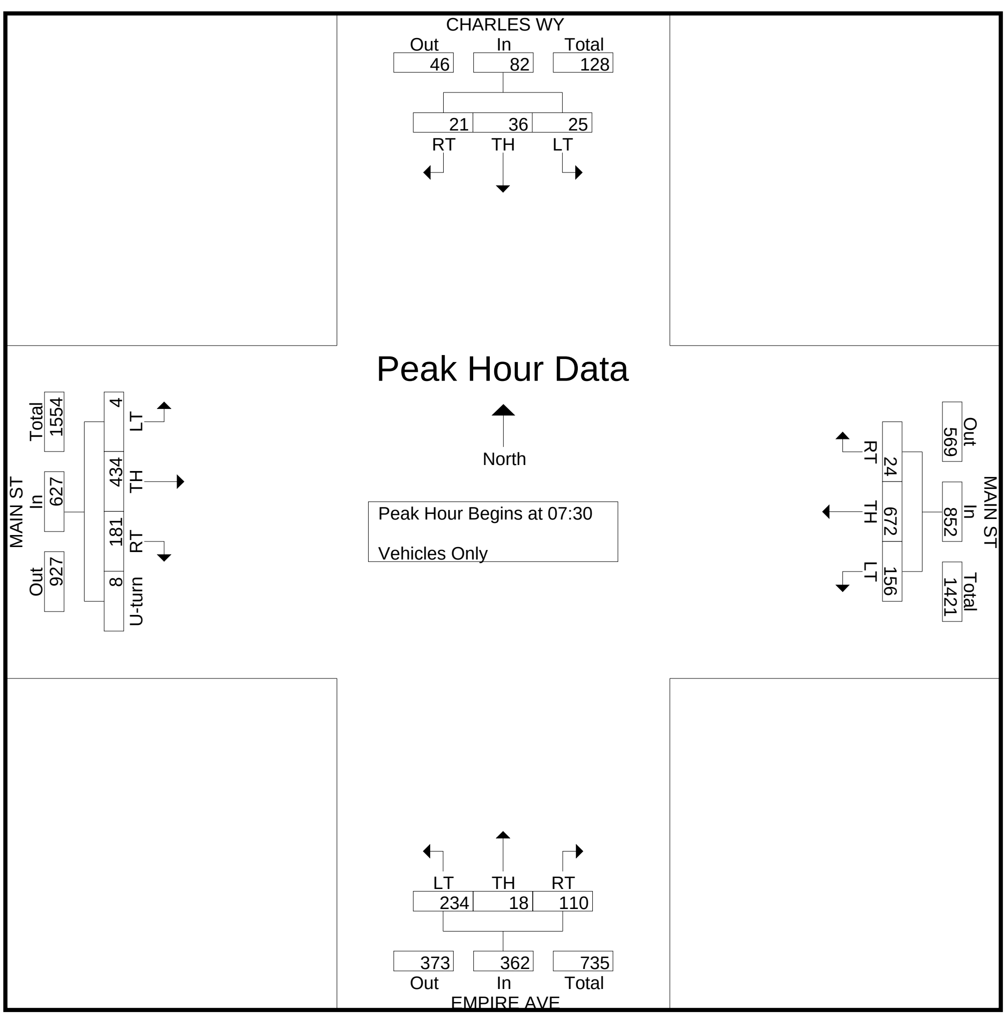
Start Time	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	U-turn	App. Total	Int. Total
07:00	6	4	1	11	1	145	11	157	8	0	30	38	20	54	3	3	80	286
07:15	8	5	4	17	0	132	19	151	16	0	44	60	35	63	1	3	102	330
07:30	10	16	3	29	0	210	29	239	16	2	45	63	44	86	3	2	135	466
07:45	5	13	4	22	2	147	46	195	28	5	54	87	59	102	1	4	166	470
Total	29	38	12	79	3	634	105	742	68	7	173	248	158	305	8	12	483	1552
08:00	3	6	12	21	4	138	53	195	29	8	61	98	51	122	0	0	173	487
08:15	3	1	6	10	18	177	28	223	37	3	74	114	27	124	0	2	153	500
08:30	7	4	0	11	3	202	24	229	19	4	39	62	37	109	3	1	150	452
08:45	5	2	1	8	1	132	19	152	16	3	33	52	33	102	2	0	137	349
Total	18	13	19	50	26	649	124	799	101	18	207	326	148	457	5	3	613	1788
Grand Total	47	51	31	129	29	1283	229	1541	169	25	380	574	306	762	13	15	1096	3340
Apprch %	36.4	39.5	24		1.9	83.3	14.9		29.4	4.4	66.2		27.9	69.5	1.2	1.4		
Total %	1.4	1.5	0.9	3.9	0.9	38.4	6.9	46.1	5.1	0.7	11.4	17.2	9.2	22.8	0.4	0.4	32.8	

	CHARLES WY Southbound				MAIN ST Westbound				EMPIRE AVE Northbound				MAIN ST Eastbound					
Start Time	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	U-turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 07:30																		
07:30	**10**	**16**	3	**29**	0	**210**	29	**239**	16	2	45	63	44	86	**3**	2	135	466
07:45	5	13	4	22	2	147	46	195	28	5	54	87	**59**	102	1	**4**	166	470
08:00	3	6	**12**	21	4	138	**53**	195	29	**8**	61	98	51	122	0	0	**173**	487
08:15	3	1	6	10	**18**	177	28	223	**37**	3	**74**	**114**	27	**124**	0	2	153	**500**
Total Volume	21	36	25	82	24	672	156	852	110	18	234	362	181	434	4	8	627	1923
% App. Total	25.6	43.9	30.5		2.8	78.9	18.3		30.4	5	64.6		28.9	69.2	0.6	1.3		
PHF	.525	.563	.521	.707	.333	.800	.736	.891	.743	.563	.791	.794	.767	.875	.333	.500	.906	.962



CITY OF OAKLEY

fp
Mietek 916-806-0250

File Name : empire-main-p
Site Code : 2
Start Date : 11/18/2008
Page No : 1

Groups Printed- Vehicles Only

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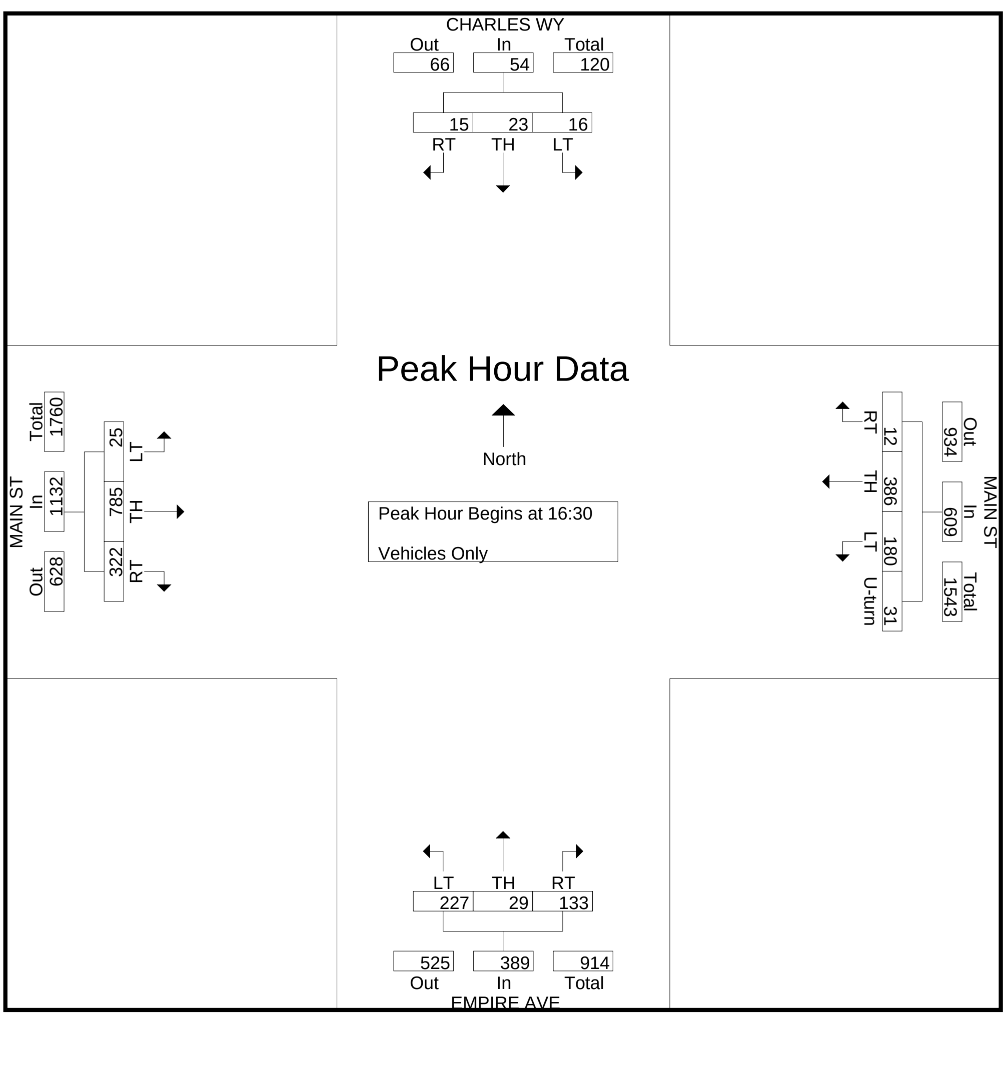
16:15	3	6	2	11	5	92	36	7	140	25	11	44	80	56	167	10	233	464
16:30	3	6	4	13	5	111	39	8	163	33	5	55	93	78	241	5	324	593
16:45	7	4	2	13	3	96	53	6	158	35	9	62	106	87	199	9	295	572
Total	16	20	11	47	17	422	163	30	632	124	31	221	376	286	788	27	1101	2156
17:00	1	4	6	11	2	85	44	6	137	33	7	55	95	79	175	5	259	502
17:15	4	9	4	17	2	94	44	11	151	32	8	55	95	78	170	6	254	517
17:30	1	4	3	8	5	132	34	8	179	43	9	54	106	73	190	5	268	561
17:45	1	9	6	16	1	84	35	8	128	35	2	44	81	72	119	6	197	422
Total	7	26	19	52	10	395	157	33	595	143	26	208	377	302	654	22	978	2002
Grand Total	23	46	30	99	27	817	320	63	1227	267	57	429	753	588	1442	49	2079	4158
Apprch %	23.2	46.5	30.3		2.2	66.6	26.1	5.1		35.5	7.6	57		28.3	69.4	2.4		
Total %	0.6	1.1	0.7	2.4	0.6	19.6	7.7	1.5	29.5	6.4	1.4	10.3	18.1	14.1	34.7	1.2	50	

	CHARLES WY Southbound				MAIN ST Westbound					EMPIRE AVE Northbound				MAIN ST Eastbound				
Start Time	RT	TH	LT	App. Total	RT	TH	LT	U-turn	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 16:30																		
16:30	3	6	4	13	**5**	**111**	39	8	**163**	33	5	55	93	78	**241**	5	**324**	**593**
16:45	**7**	4	2	13	3	96	**53**	6	158	**35**	**9**	**62**	**106**	**87**	199	**9**	295	572
17:00	1	4	**6**	11	2	85	44	6	137	33	7	55	95	79	175	5	259	502
17:15	4	**9**	4	**17**	2	94	44	**11**	151	32	8	55	95	78	170	6	254	517
Total Volume	15	23	16	54	12	386	180	31	609	133	29	227	389	322	785	25	1132	2184
% App. Total	27.8	42.6	29.6		2	63.4	29.6	5.1		34.2	7.5	58.4		28.4	69.3	2.2		
PHF	.536	.639	.667	.794	.600	.869	.849	.705	.934	.950	.806	.915	.917	.925	.814	.694	.873	.921



MARKS TRAFFIC DATA

CITY OF OAKLEY

fp
Mietek 916-806-0250

File Name : empire-oakley-a
Site Code : 2
Start Date : 11/18/2008

Groups Printed- Vehicles Only

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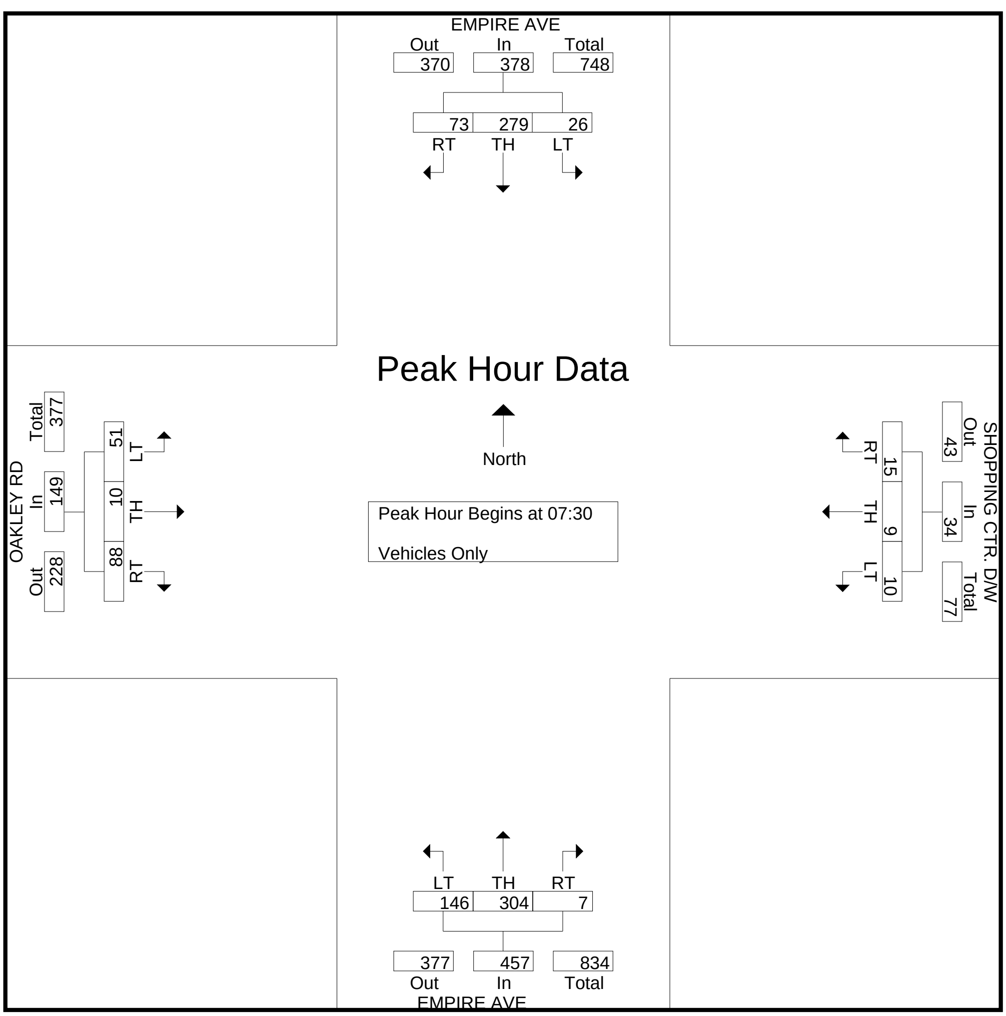
Start Time	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	Int. Total
07:00	3	29	3	35	2	1	1	4	1	50	24	75	7	1	8	16	130
07:15	6	48	1	55	3	1	2	6	1	54	17	72	7	2	12	21	154
07:30	16	65	3	84	0	1	1	2	2	58	35	95	18	1	8	27	208
07:45	12	85	5	102	5	3	3	11	1	68	36	105	22	3	16	41	259
Total	37	227	12	276	10	6	7	23	5	230	112	347	54	7	44	105	751
08:00	21	81	5	107	5	4	2	11	2	97	36	135	27	3	13	43	296
08:15	24	48	13	85	5	1	4	10	2	81	39	122	21	3	14	38	255
08:30	15	42	11	68	8	3	1	12	0	48	15	63	16	0	8	24	167
08:45	6	47	7	60	4	5	1	10	2	52	21	75	13	0	11	24	169
Total	66	218	36	320	22	13	8	43	6	278	111	395	77	6	46	129	887
Grand Total	103	445	48	596	32	19	15	66	11	508	223	742	131	13	90	234	1638
Apprch %	17.3	74.7	8.1		48.5	28.8	22.7		1.5	68.5	30.1		56	5.6	38.5		
Total %	6.3	27.2	2.9	36.4	2	1.2	0.9	4	0.7	31	13.6	45.3	8	0.8	5.5	14.3	

	EMPIRE AVE Southbound				SHOPPING CTR. D/W Westbound				EMPIRE AVE Northbound				OAKLEY RD Eastbound				
Start Time	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30																	
07:30	16	65	3	84	0	1	1	2	**2**	58	35	95	18	1	8	27	208
07:45	12	**85**	5	102	**5**	3	3	**11**	1	68	36	105	22	**3**	**16**	41	259
08:00	21	81	5	**107**	5	**4**	2	11	2	**97**	36	**135**	**27**	3	13	**43**	**296**
08:15	**24**	48	**13**	85	5	1	**4**	10	2	81	**39**	122	21	3	14	38	255
Total Volume	73	279	26	378	15	9	10	34	7	304	146	457	88	10	51	149	1018
% App. Total	19.3	73.8	6.9		44.1	26.5	29.4		1.5	66.5	31.9		59.1	6.7	34.2		
PHF	.760	.821	.500	.883	.750	.563	.625	.773	.875	.784	.936	.846	.815	.833	.797	.866	.860



MARKS TRAFFIC DATA

CITY OF OAKLEY

fp
Mietek 916-806-0250

File Name : empire-oakley-p
Site Code : 2
Start Date : 11/18/2008
Page No : 1

Groups Printed- Vehicles Only

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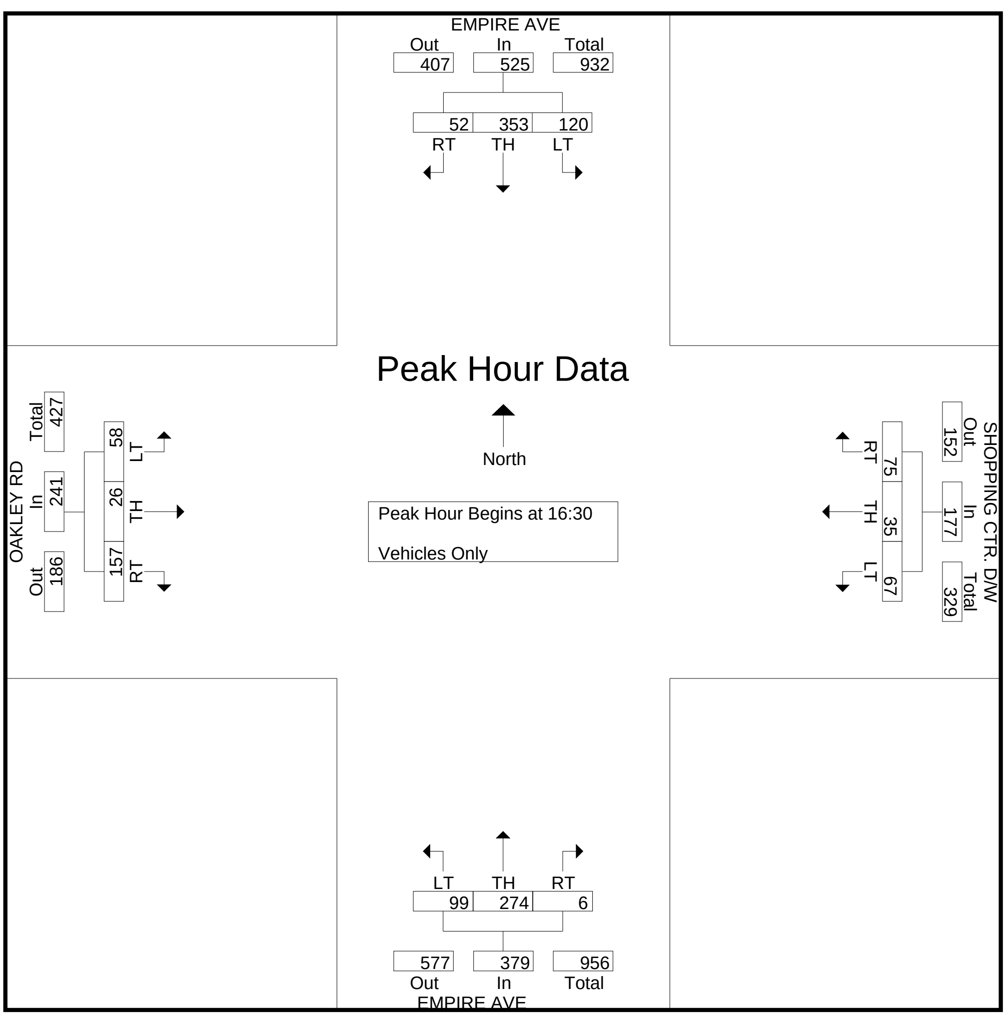
Start Time	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	Int. Total
16:00	11	72	21	104	12	7	18	37	1	80	21	102	19	5	6	30	273
16:15	17	60	20	97	17	8	22	47	3	57	21	81	22	7	9	38	263
16:30	15	75	24	114	20	8	15	43	3	63	13	79	37	6	16	59	295
16:45	12	110	25	147	23	11	15	49	0	72	28	100	31	9	17	57	353
Total	55	317	90	462	72	34	70	176	7	272	83	362	109	27	48	184	1184
17:00	12	83	36	131	15	7	17	39	2	72	30	104	60	4	13	77	351
17:15	13	85	35	133	17	9	20	46	1	67	28	96	29	7	12	48	323
17:30	19	73	24	116	19	10	16	45	1	71	15	87	27	9	10	46	294
17:45	9	84	26	119	12	14	13	39	2	62	15	79	24	6	11	41	278
Total	53	325	121	499	63	40	66	169	6	272	88	366	140	26	46	212	1246
Grand Total	108	642	211	961	135	74	136	345	13	544	171	728	249	53	94	396	2430
Apprch %	11.2	66.8	22		39.1	21.4	39.4		1.8	74.7	23.5		62.9	13.4	23.7		
Total %	4.4	26.4	8.7	39.5	5.6	3	5.6	14.2	0.5	22.4	7	30	10.2	2.2	3.9	16.3	

	EMPIRE AVE Southbound				SHOPPING CTR. D/W Westbound				EMPIRE AVE Northbound				OAKLEY RD Eastbound				
Start Time	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 16:30																	
16:30	**15**	75	24	114	20	8	15	43	**3**	63	13	79	37	6	16	59	295
16:45	12	**110**	25	**147**	**23**	**11**	15	**49**	0	**72**	28	100	31	**9**	**17**	57	**353**
17:00	12	83	**36**	131	15	7	17	39	2	72	**30**	**104**	**60**	4	13	**77**	351
17:15	13	85	35	133	17	9	**20**	46	1	67	28	96	29	7	12	48	323
Total Volume	52	353	120	525	75	35	67	177	6	274	99	379	157	26	58	241	1322
% App. Total	9.9	67.2	22.9		42.4	19.8	37.9		1.6	72.3	26.1		65.1	10.8	24.1		
PHF	.867	.802	.833	.893	.815	.795	.838	.903	.500	.951	.825	.911	.654	.722	.853	.782	.936



MARKS TRAFFIC DATA

CITY OF OAKLEY

fp
Mietek 916-806-0250

File Name : main-cypress-a
Site Code : 7
Start Date : 11/18/2008
Page No : 1

Groups Printed- Vehicles Only

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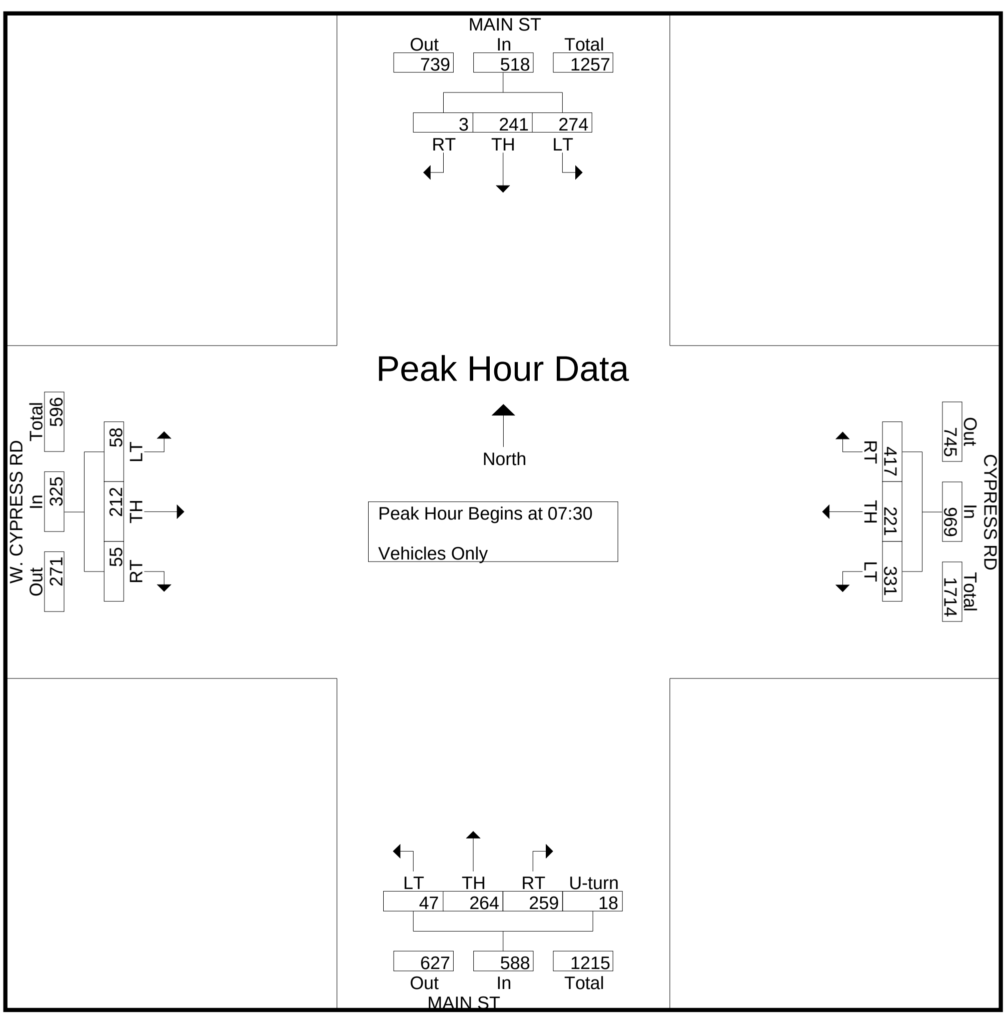
Start Time	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	U-turn	App. Total	RT	TH	LT	App. Total	Int. Total
07:00	1	44	26	71	50	11	20	81	13	50	5	1	69	6	8	10	24	245
07:15	0	39	37	76	61	18	35	114	27	65	7	0	99	7	29	11	47	336
07:30	2	44	41	87	86	50	60	196	44	58	8	8	118	9	47	18	74	475
07:45	0	68	66	134	102	51	87	240	71	77	12	4	164	15	51	14	80	618
Total	3	195	170	368	299	130	202	631	155	250	32	13	450	37	135	53	225	1674
08:00	1	58	77	136	121	58	104	283	81	62	12	2	157	14	59	11	84	660
08:15	0	71	90	161	108	62	80	250	63	67	15	4	149	17	55	15	87	647
08:30	1	59	38	98	55	17	47	119	24	68	13	3	108	16	21	11	48	373
08:45	1	44	32	77	54	14	28	96	12	50	12	8	82	6	18	10	34	289
Total	3	232	237	472	338	151	259	748	180	247	52	17	496	53	153	47	253	1969
Grand Total	6	427	407	840	637	281	461	1379	335	497	84	30	946	90	288	100	478	3643
Apprch %	0.7	50.8	48.5		46.2	20.4	33.4		35.4	52.5	8.9	3.2		18.8	60.3	20.9		
Total %	0.2	11.7	11.2	23.1	17.5	7.7	12.7	37.9	9.2	13.6	2.3	0.8	26	2.5	7.9	2.7	13.1	

	MAIN ST Southbound				CYPRESS RD Westbound				MAIN ST Northbound					W. CYPRESS RD Eastbound				
Start Time	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	U-turn	App. Total	RT	TH	LT	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 07:30																		
07:30	**2**	44	41	87	86	50	60	196	44	58	8	**8**	118	9	47	**18**	74	475
07:45	0	68	66	134	102	51	87	240	71	**77**	12	4	**164**	15	51	14	80	618
08:00	1	58	77	136	**121**	58	**104**	**283**	**81**	62	12	2	157	14	**59**	11	84	**660**
08:15	0	**71**	**90**	**161**	108	**62**	80	250	63	67	**15**	4	149	**17**	55	15	**87**	647
Total Volume	3	241	274	518	417	221	331	969	259	264	47	18	588	55	212	58	325	2400
% App. Total	0.6	46.5	52.9		43	22.8	34.2		44	44.9	8	3.1		16.9	65.2	17.8		
PHF	.375	.849	.761	.804	.862	.891	.796	.856	.799	.857	.783	.563	.896	.809	.898	.806	.934	.909



MARKS TRAFFIC DATA

CITY OF OAKLEY

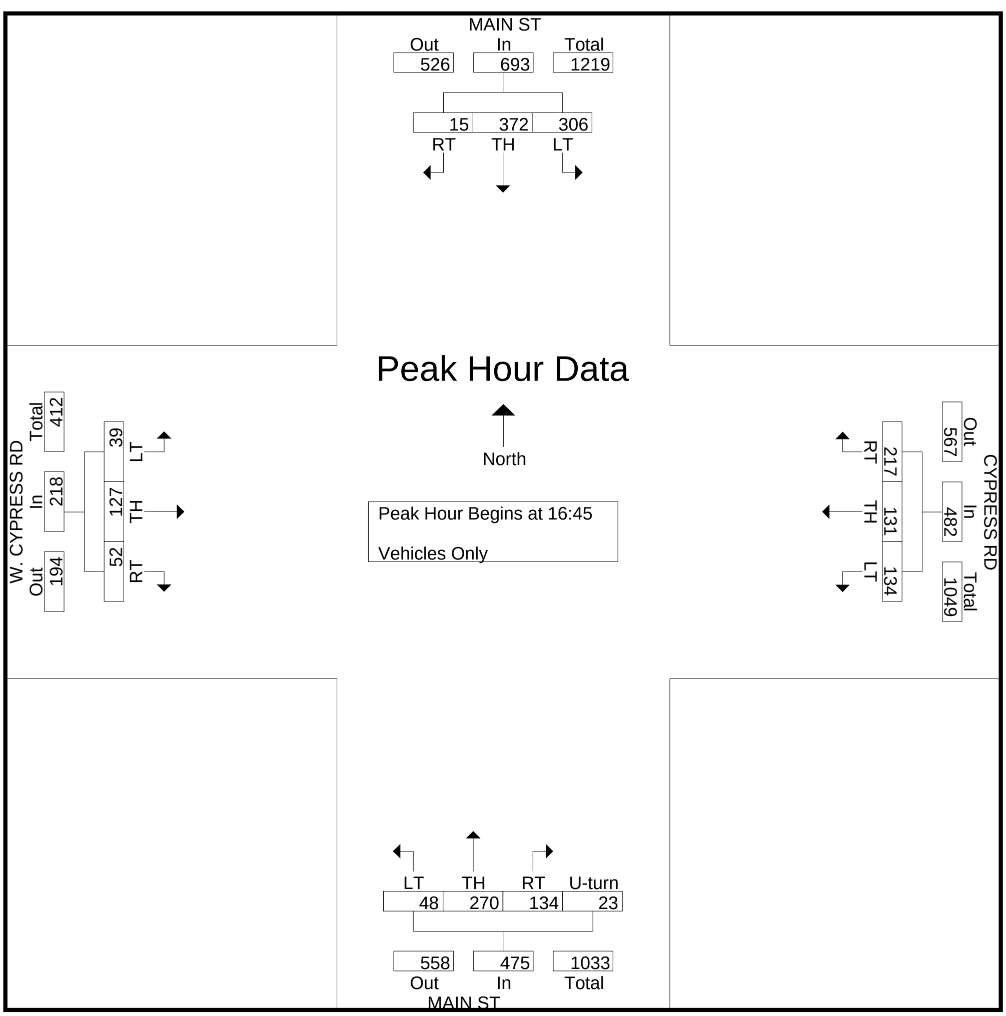
fp
Mietek 916-806-0250

File Name : main-cypress-p
Site Code : 7
Start Date : 11/18/2008
Page No : 1

Groups Printed- Vehicles Only

	MAIN ST Southbound				CYPRESS RD Westbound				MAIN ST Northbound					W. CYPRESS RD Eastbound				
Start Time	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	U-turn	App. Total	RT	TH	LT	App. Total	Int. Total
16:00	2	95	57	154	44	42	45	131	43	78	11	7	139	13	43	5	61	485
16:15	1	73	62	136	55	37	36	128	28	60	15	4	107	12	36	19	67	438
16:30	4	82	83	169	52	20	27	99	33	73	9	7	122	5	33	14	52	442
16:45	4	91	85	180	46	32	36	114	45	60	13	6	124	17	26	12	55	473
Total	11	341	287	639	197	131	144	472	149	271	48	24	492	47	138	50	235	1838
17:00	3	101	80	184	64	38	38	140	27	56	12	5	100	10	35	13	58	482
17:15	4	83	74	161	48	35	27	110	30	80	15	9	134	13	28	5	46	451
17:30	4	97	67	168	59	26	33	118	32	74	8	3	117	12	38	9	59	462
17:45	2	69	62	133	35	32	39	106	37	50	16	8	111	10	38	14	62	412
Total	13	350	283	646	206	131	137	474	126	260	51	25	462	45	139	41	225	1807
Grand Total	24	691	570	1285	403	262	281	946	275	531	99	49	954	92	277	91	460	3645
Apprch %	1.9	53.8	44.4		42.6	27.7	29.7		28.8	55.7	10.4	5.1		20	60.2	19.8		
Total %	0.7	19	15.6	35.3	11.1	7.2	7.7	26	7.5	14.6	2.7	1.3	26.2	2.5	7.6	2.5	12.6	

	MAIN ST Southbound				CYPRESS RD Westbound				MAIN ST Northbound					W. CYPRESS RD Eastbound				
Start Time	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	U-turn	App. Total	RT	TH	LT	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 16:45																		
16:45	**4**	91	**85**	180	46	32	36	114	**45**	60	13	6	124	**17**	26	12	55	473
17:00	3	**101**	80	**184**	**64**	**38**	**38**	**140**	27	56	12	5	100	10	35	**13**	58	**482**
17:15	4	83	74	161	48	35	27	110	30	**80**	**15**	**9**	**134**	13	28	5	46	451
17:30	4	97	67	168	59	26	33	118	32	74	8	3	117	12	**38**	9	**59**	462
Total Volume	15	372	306	693	217	131	134	482	134	270	48	23	475	52	127	39	218	1868
% App. Total	2.2	53.7	44.2		45	27.2	27.8		28.2	56.8	10.1	4.8		23.9	58.3	17.9		
PHF	.938	.921	.900	.942	.848	.862	.882	.861	.744	.844	.800	.639	.886	.765	.836	.750	.924	.969



MARKS TRAFFIC DATA

CITY OF OAKLEY

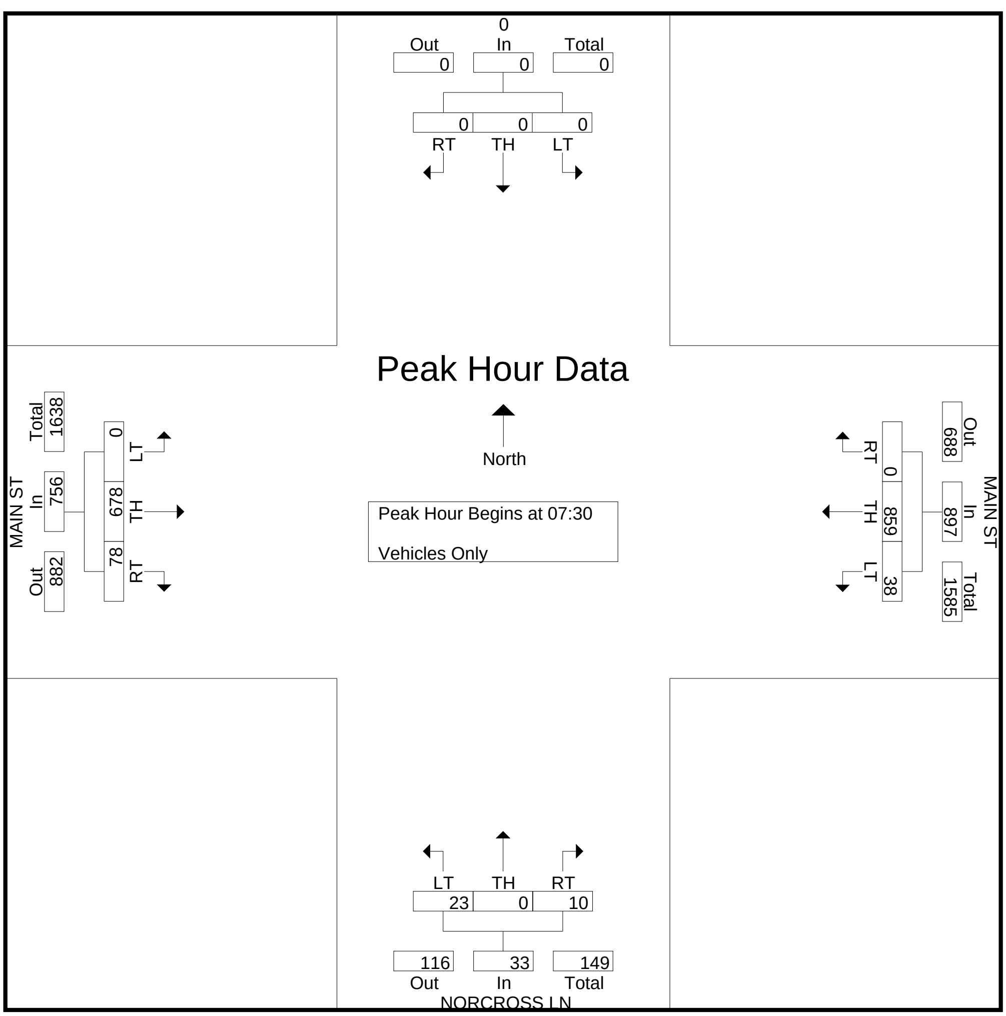
fp
Mietek 916-806-0250

File Name : main-norcross-a
Site Code : 4
Start Date : 11/18/2008
Page No : 1

Groups Printed- Vehicles Only

	0 Southbound				MAIN ST Westbound				NORCROSS LN Northbound				MAIN ST Eastbound				
Start Time	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	Int. Total
07:00	0	0	0	0	0	123	2	125	0	0	6	6	1	84	0	85	216
07:15	0	0	0	0	0	143	5	148	2	0	4	6	9	94	0	103	257
07:30	0	0	0	0	0	192	4	196	1	0	1	2	22	157	0	179	377
07:45	0	0	0	0	0	206	8	214	1	0	4	5	18	172	0	190	409
Total	0	0	0	0	0	664	19	683	4	0	15	19	50	507	0	557	1259
08:00	0	0	0	0	0	245	11	256	2	0	9	11	18	187	0	205	472
08:15	0	0	0	0	0	216	15	231	6	0	9	15	20	162	0	182	428
08:30	0	0	0	0	0	165	7	172	6	0	10	16	6	113	0	119	307
08:45	0	0	0	0	0	132	0	132	0	0	3	3	3	118	0	121	256
Total	0	0	0	0	0	758	33	791	14	0	31	45	47	580	0	627	1463
Grand Total	0	0	0	0	0	1422	52	1474	18	0	46	64	97	1087	0	1184	2722
Apprch %	0	0	0		0	96.5	3.5		28.1	0	71.9		8.2	91.8	0		
Total %	0	0	0	0	0	52.2	1.9	54.2	0.7	0	1.7	2.4	3.6	39.9	0	43.5	

	0 Southbound				MAIN ST Westbound				NORCROSS LN Northbound				MAIN ST Eastbound				
Start Time	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30																	
07:30	0	0	0	0	0	192	4	196	1	0	1	2	**22**	157	0	179	377
07:45	0	0	0	0	0	206	8	214	1	0	4	5	18	172	0	190	409
08:00	0	0	0	0	0	**245**	11	**256**	2	0	**9**	11	18	**187**	0	**205**	**472**
08:15	0	0	0	0	0	216	**15**	231	**6**	0	9	**15**	20	162	0	182	428
Total Volume	0	0	0	0	0	859	38	897	10	0	23	33	78	678	0	756	1686
% App. Total	0	0	0		0	95.8	4.2		30.3	0	69.7		10.3	89.7	0		
PHF	.000	.000	.000	.000	.000	.877	.633	.876	.417	.000	.639	.550	.886	.906	.000	.922	.893



MARKS TRAFFIC DATA

CITY OF OAKLEY

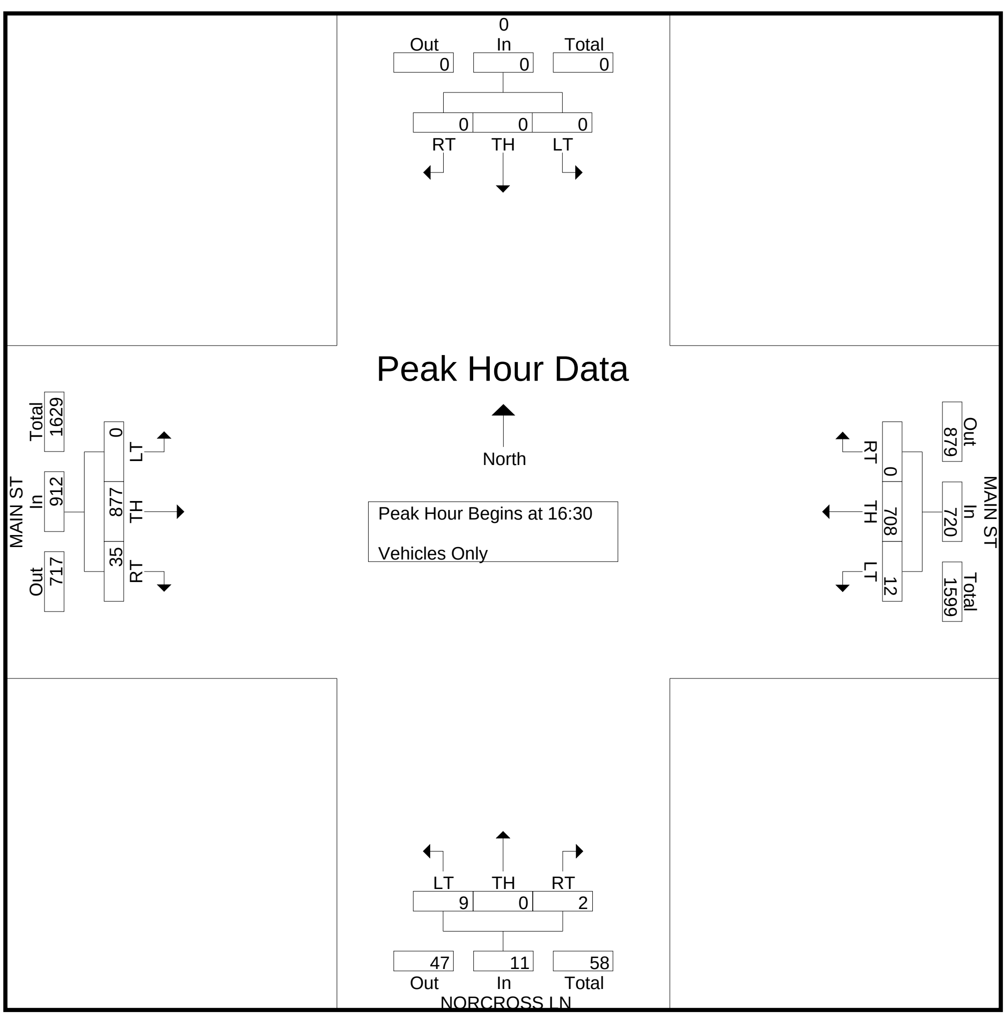
fp
Mietek 916-806-0250

File Name : main-norcross-p
Site Code : 4
Start Date : 11/18/2008
Page No : 1

Groups Printed- Vehicles Only

	0 Southbound				MAIN ST Westbound				NORCROSS LN Northbound				MAIN ST Eastbound				
Start Time	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	Int. Total
16:00	0	0	0	0	0	181	3	184	2	0	4	6	10	201	0	211	401
16:15	0	0	0	0	0	170	4	174	1	0	0	1	6	187	0	193	368
16:30	0	0	0	0	0	186	2	188	0	0	2	2	5	224	0	229	419
16:45	0	0	0	0	0	150	3	153	0	0	1	1	6	203	0	209	363
Total	0	0	0	0	0	687	12	699	3	0	7	10	27	815	0	842	1551
17:00	0	0	0	0	0	190	3	193	2	0	1	3	11	251	0	262	458
17:15	0	0	0	0	0	182	4	186	0	0	5	5	13	199	0	212	403
17:30	0	0	0	0	0	179	4	183	0	0	4	4	6	224	0	230	417
17:45	0	0	0	0	0	155	6	161	1	0	4	5	5	178	0	183	349
Total	0	0	0	0	0	706	17	723	3	0	14	17	35	852	0	887	1627
Grand Total	0	0	0	0	0	1393	29	1422	6	0	21	27	62	1667	0	1729	3178
Apprch %	0	0	0		0	98	2		22.2	0	77.8		3.6	96.4	0		
Total %	0	0	0	0	0	43.8	0.9	44.7	0.2	0	0.7	0.8	2	52.5	0	54.4	

	0 Southbound				MAIN ST Westbound				NORCROSS LN Northbound				MAIN ST Eastbound				
Start Time	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 16:30																	
16:30	0	0	0	0	0	186	2	188	0	0	2	2	5	224	0	229	419
16:45	0	0	0	0	0	150	3	153	0	0	1	1	6	203	0	209	363
17:00	0	0	0	0	0	**190**	3	**193**	**2**	0	1	3	11	**251**	0	**262**	**458**
17:15	0	0	0	0	0	182	**4**	186	0	0	**5**	**5**	**13**	199	0	212	403
Total Volume	0	0	0	0	0	708	12	720	2	0	9	11	35	877	0	912	1643
% App. Total	0	0	0		0	98.3	1.7		18.2	0	81.8		3.8	96.2	0		
PHF	.000	.000	.000	.000	.000	.932	.750	.933	.250	.000	.450	.550	.673	.874	.000	.870	.897



MARKS TRAFFIC DATA

CITY OF OAKLEY

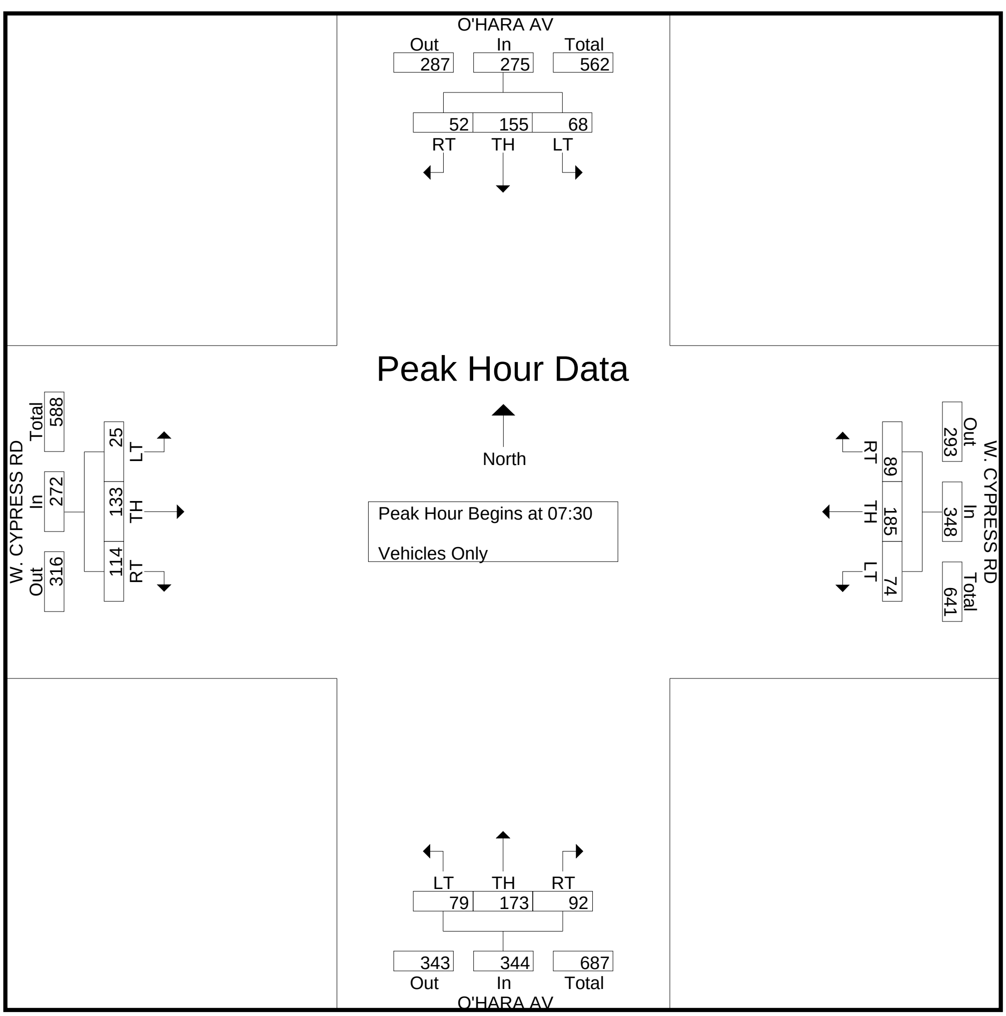
fp
Mietek 916-806-0250

File Name : ohara-cypress-a
Site Code : 8
Start Date : 11/18/2008
Page No : 1

Groups Printed- Vehicles Only

	O'HARA AV Southbound				W. CYPRESS RD Westbound				O'HARA AV Northbound				W. CYPRESS RD Eastbound				
Start Time	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	Int. Total
07:00	2	15	4	21	4	11	10	25	6	15	5	26	11	14	1	26	98
07:15	4	21	8	33	9	19	15	43	9	22	3	34	17	26	1	44	154
07:30	5	41	11	57	12	36	26	74	12	30	6	48	31	38	3	72	251
07:45	13	56	12	81	19	44	21	84	19	35	33	87	36	33	8	77	329
Total	24	133	35	192	44	110	72	226	46	102	47	195	95	111	13	219	832
08:00	16	32	15	63	24	49	13	86	33	50	22	105	31	43	6	80	334
08:15	18	26	30	74	34	56	14	104	28	58	18	104	16	19	8	43	325
08:30	4	45	10	59	13	23	7	43	7	38	12	57	8	19	5	32	191
08:45	2	28	5	35	3	16	8	27	8	24	9	41	7	7	2	16	119
Total	40	131	60	231	74	144	42	260	76	170	61	307	62	88	21	171	969
Grand Total	64	264	95	423	118	254	114	486	122	272	108	502	157	199	34	390	1801
Apprch %	15.1	62.4	22.5		24.3	52.3	23.5		24.3	54.2	21.5		40.3	51	8.7		
Total %	3.6	14.7	5.3	23.5	6.6	14.1	6.3	27	6.8	15.1	6	27.9	8.7	11	1.9	21.7	

	O'HARA AV Southbound				W. CYPRESS RD Westbound				O'HARA AV Northbound				W. CYPRESS RD Eastbound				
Start Time	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30																	
07:30	5	41	11	57	12	36	**26**	74	12	30	6	48	31	38	3	72	251
07:45	13	**56**	12	**81**	19	44	21	84	19	35	**33**	87	**36**	33	**8**	77	329
08:00	16	32	15	63	24	49	13	86	**33**	50	22	**105**	31	**43**	6	**80**	**334**
08:15	**18**	26	**30**	74	**34**	**56**	14	**104**	28	**58**	18	104	16	19	8	43	325
Total Volume	52	155	68	275	89	185	74	348	92	173	79	344	114	133	25	272	1239
% App. Total	18.9	56.4	24.7		25.6	53.2	21.3		26.7	50.3	23		41.9	48.9	9.2		
PHF	.722	.692	.567	.849	.654	.826	.712	.837	.697	.746	.598	.819	.792	.773	.781	.850	.927



MARKS TRAFFIC DATA

CITY OF OAKLEY

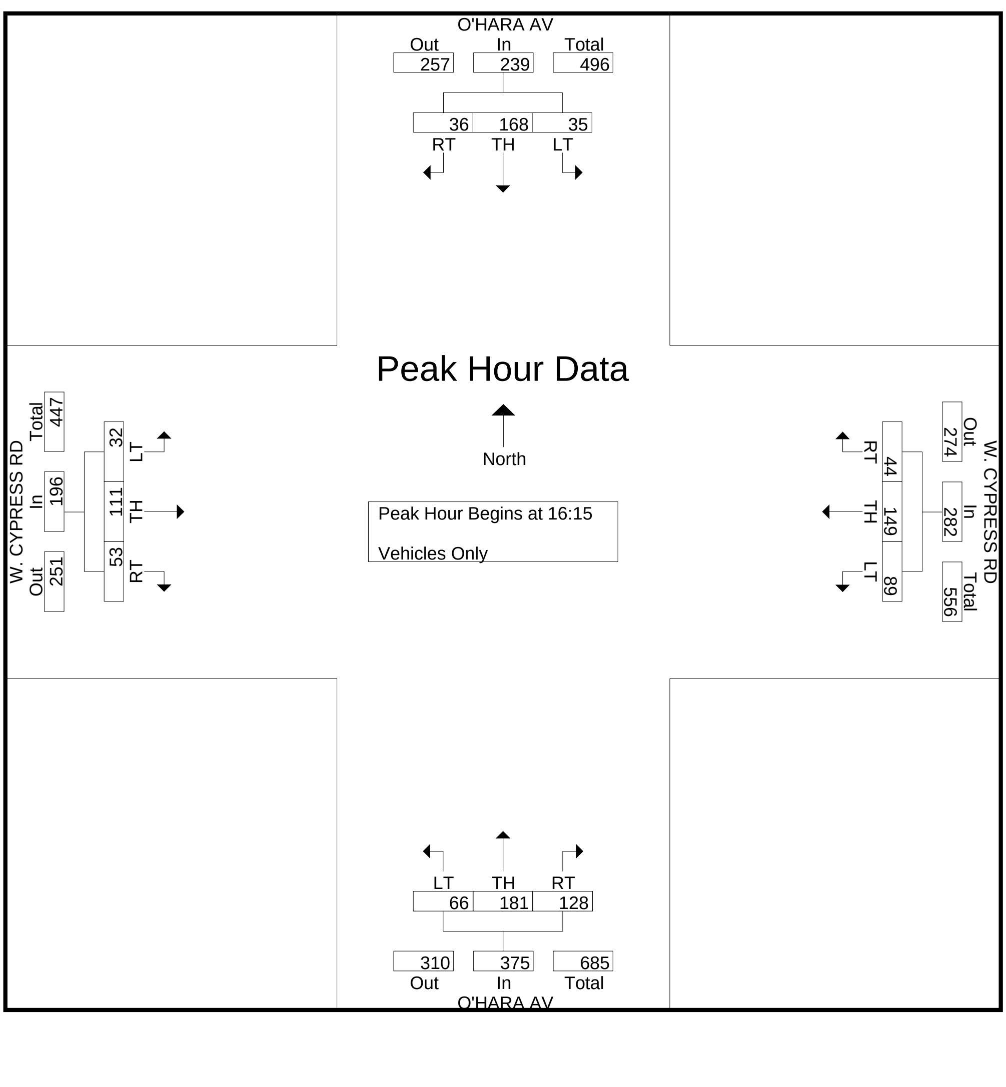
fp
Mietek 916-806-0250

File Name : ohara-cypress-p
Site Code : 8
Start Date : 11/18/2008
Page No : 1

Groups Printed- Vehicles Only

	O'HARA AV Southbound				W. CYPRESS RD Westbound				O'HARA AV Northbound				W. CYPRESS RD Eastbound				
Start Time	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	Int. Total
16:00	2	42	12	56	14	39	21	74	27	39	20	86	11	36	8	55	271
16:15	5	37	6	48	10	34	20	64	39	48	12	99	14	23	13	50	261
16:30	12	59	8	79	6	32	9	47	25	46	17	88	11	28	2	41	255
16:45	7	33	12	52	11	25	23	59	32	39	19	90	19	34	10	63	264
Total	26	171	38	235	41	130	73	244	123	172	68	363	55	121	33	209	1051
17:00	12	39	9	60	17	58	37	112	32	48	18	98	9	26	7	42	312
17:15	6	36	14	56	10	31	20	61	23	47	19	89	12	33	9	54	260
17:30	11	41	15	67	12	25	26	63	19	26	12	57	17	38	3	58	245
17:45	8	39	9	56	7	33	20	60	24	35	16	75	17	29	6	52	243
Total	37	155	47	239	46	147	103	296	98	156	65	319	55	126	25	206	1060
Grand Total	63	326	85	474	87	277	176	540	221	328	133	682	110	247	58	415	2111
Apprch %	13.3	68.8	17.9		16.1	51.3	32.6		32.4	48.1	19.5		26.5	59.5	14		
Total %	3	15.4	4	22.5	4.1	13.1	8.3	25.6	10.5	15.5	6.3	32.3	5.2	11.7	2.7	19.7	

	O'HARA AV Southbound				W. CYPRESS RD Westbound				O'HARA AV Northbound				W. CYPRESS RD Eastbound				
Start Time	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 16:15																	
16:15	5	37	6	48	10	34	20	64	**39**	**48**	12	**99**	14	23	**13**	50	261
16:30	**12**	**59**	8	**79**	6	32	9	47	25	46	17	88	11	28	2	41	255
16:45	7	33	**12**	52	11	25	23	59	32	39	**19**	90	**19**	**34**	10	**63**	264
17:00	12	39	9	60	**17**	**58**	**37**	**112**	32	48	18	98	9	26	7	42	**312**
Total Volume	36	168	35	239	44	149	89	282	128	181	66	375	53	111	32	196	1092
% App. Total	15.1	70.3	14.6		15.6	52.8	31.6		34.1	48.3	17.6		27	56.6	16.3		
PHF	.750	.712	.729	.756	.647	.642	.601	.629	.821	.943	.868	.947	.697	.816	.615	.778	.875



MARKS TRAFFIC DATA

CITY OF OAKLEY

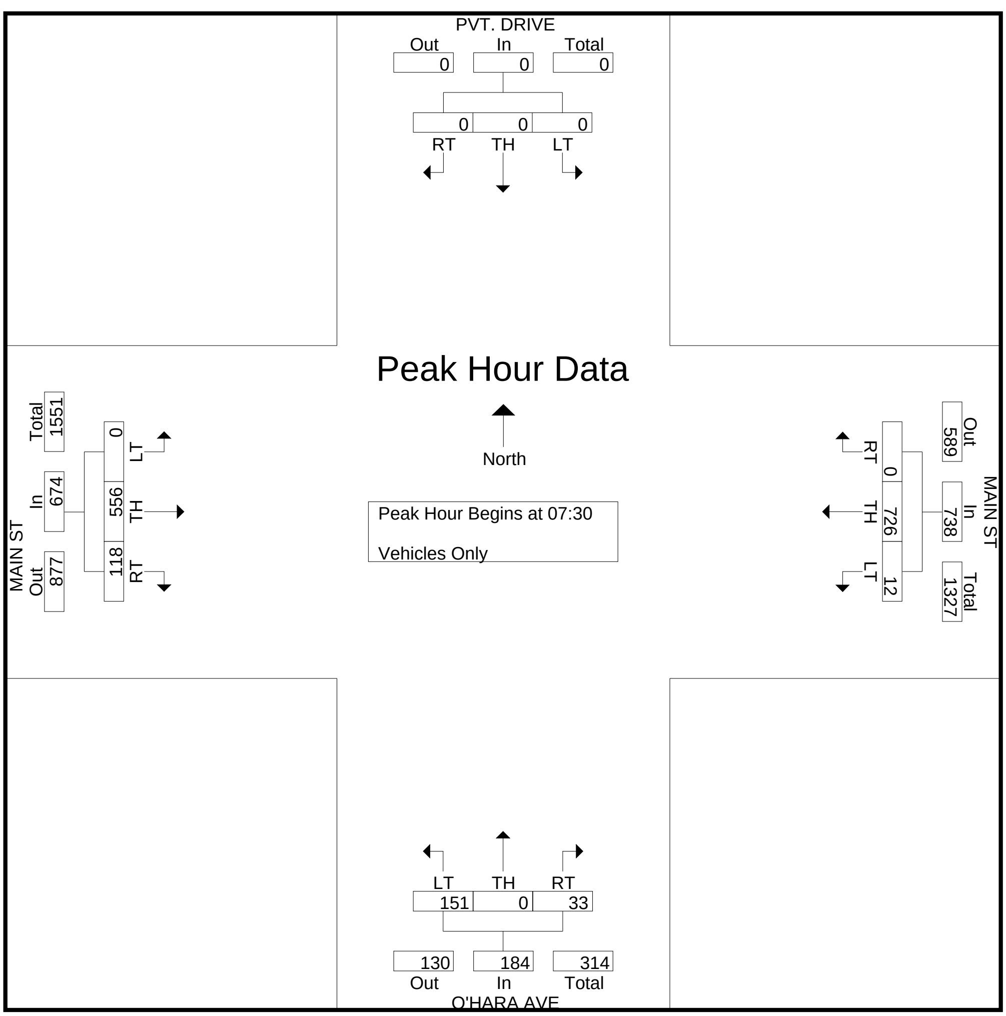
fp
Mietek 916-806-0250

File Name : ohara-main-a
Site Code : 5
Start Date : 11/18/2008
Page No : 1

Groups Printed- Vehicles Only

	PVT. DRIVE Southbound				MAIN ST Westbound				O'HARA AVE Northbound				MAIN ST Eastbound				
Start Time	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	Int. Total
07:00	0	0	0	0	0	110	4	114	6	0	17	23	21	70	0	91	228
07:15	0	0	0	0	0	129	3	132	4	0	15	19	17	74	0	91	242
07:30	0	0	0	0	0	159	1	160	11	0	28	39	41	109	0	150	349
07:45	0	0	0	0	0	186	3	189	6	0	31	37	29	146	0	175	401
Total	0	0	0	0	0	584	11	595	27	0	91	118	108	399	0	507	1220
08:00	0	0	0	0	0	192	6	198	9	0	50	59	14	161	0	175	432
08:15	0	0	0	0	0	189	2	191	7	0	42	49	34	140	0	174	414
08:30	0	0	0	0	0	141	7	148	5	0	31	36	26	88	0	114	298
08:45	0	0	0	0	0	104	1	105	7	0	30	37	19	95	0	114	256
Total	0	0	0	0	0	626	16	642	28	0	153	181	93	484	0	577	1400
Grand Total	0	0	0	0	0	1210	27	1237	55	0	244	299	201	883	0	1084	2620
Apprch %	0	0	0		0	97.8	2.2		18.4	0	81.6		18.5	81.5	0		
Total %	0	0	0	0	0	46.2	1	47.2	2.1	0	9.3	11.4	7.7	33.7	0	41.4	

	PVT. DRIVE Southbound				MAIN ST Westbound				O'HARA AVE Northbound				MAIN ST Eastbound				
Start Time	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30																	
07:30	0	0	0	0	0	159	1	160	**11**	0	28	39	**41**	109	0	150	349
07:45	0	0	0	0	0	186	3	189	6	0	31	37	29	146	0	**175**	401
08:00	0	0	0	0	0	**192**	**6**	**198**	9	0	**50**	**59**	14	**161**	0	175	**432**
08:15	0	0	0	0	0	189	2	191	7	0	42	49	34	140	0	174	414
Total Volume	0	0	0	0	0	726	12	738	33	0	151	184	118	556	0	674	1596
% App. Total	0	0	0		0	98.4	1.6		17.9	0	82.1		17.5	82.5	0		
PHF	.000	.000	.000	.000	.000	.945	.500	.932	.750	.000	.755	.780	.720	.863	.000	.963	.924



MARKS TRAFFIC DATA

CITY OF OAKLEY

fp
Mietek 916-806-0250

File Name : ohara-main-p
Site Code : 5
Start Date : 11/18/2008
Page No : 1

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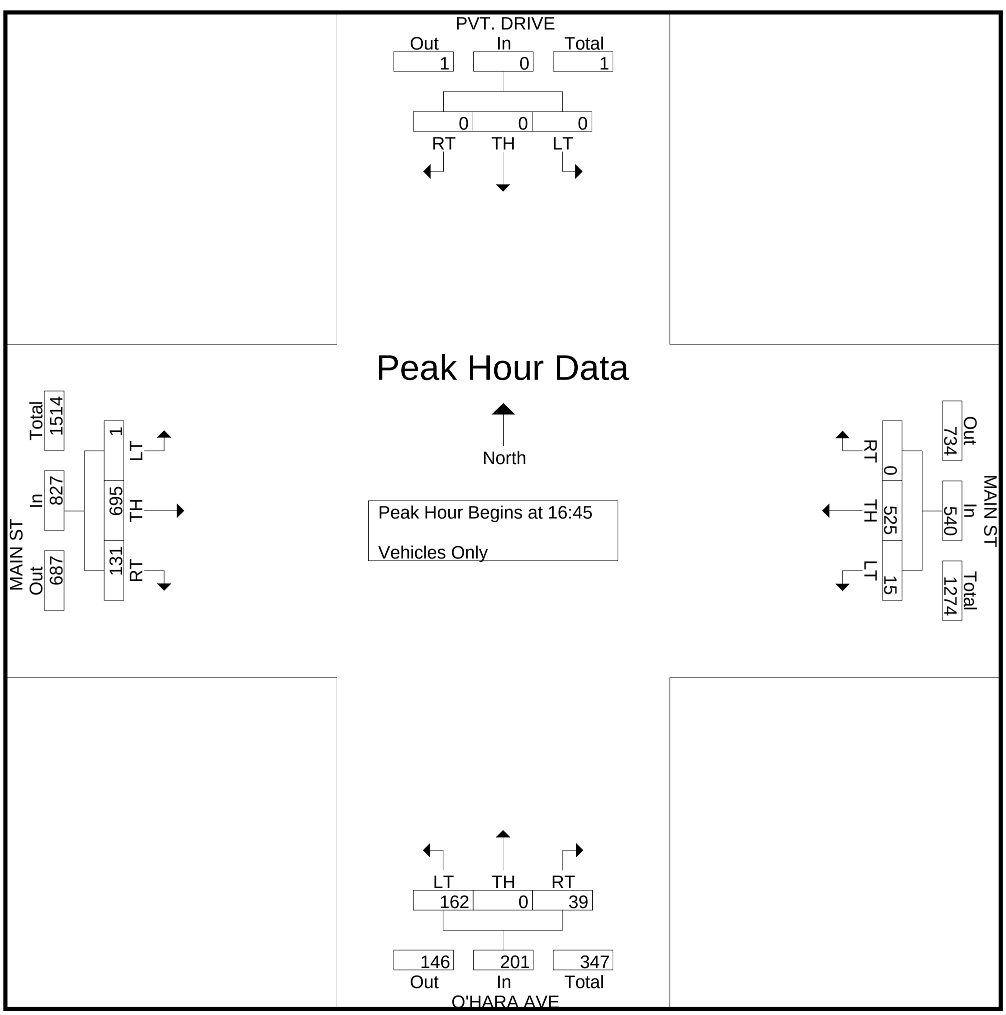
	PVT. DRIVE Southbound				MAIN ST Westbound				O'HARA AVE Northbound				MAIN ST Eastbound				
Start Time	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	Int. Total
16:00	0	0	0	0	0	127	3	130	12	0	47	59	27	160	0	187	376
16:15	0	0	0	0	0	135	1	136	16	0	36	52	38	159	0	197	385
16:30	0	0	0	0	0	134	5	139	9	0	39	48	37	173	0	210	397
16:45	0	0	0	0	0	115	0	115	8	0	27	35	28	171	0	199	349
Total	0	0	0	0	0	511	9	520	45	0	149	194	130	663	0	793	1507
17:00	0	0	0	0	0	133	4	137	11	0	52	63	31	196	1	228	428
17:15	0	0	0	0	0	134	8	142	14	0	44	58	31	158	0	189	389
17:30	0	0	0	0	0	143	3	146	6	0	39	45	41	170	0	211	402
17:45	0	0	0	0	0	104	6	110	7	0	36	43	21	151	0	172	325
Total	0	0	0	0	0	514	21	535	38	0	171	209	124	675	1	800	1544
Grand Total	0	0	0	0	0	1025	30	1055	83	0	320	403	254	1338	1	1593	3051
Apprch %	0	0	0		0	97.2	2.8		20.6	0	79.4		15.9	84	0.1		
Total %	0	0	0	0	0	33.6	1	34.6	2.7	0	10.5	13.2	8.3	43.9	0	52.2	

	PVT. DRIVE Southbound				MAIN ST Westbound				O'HARA AVE Northbound				MAIN ST Eastbound				
Start Time	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 16:45																	
16:45	0	0	0	0	0	115	0	115	8	0	27	35	28	171	0	199	349
17:00	0	0	0	0	0	133	4	137	11	0	**52**	**63**	31	**196**	**1**	**228**	**428**
17:15	0	0	0	0	0	134	**8**	142	**14**	0	44	58	31	158	0	189	389
17:30	0	0	0	0	0	**143**	3	**146**	6	0	39	45	**41**	170	0	211	402
Total Volume	0	0	0	0	0	525	15	540	39	0	162	201	131	695	1	827	1568
% App. Total	0	0	0		0	97.2	2.8		19.4	0	80.6		15.8	84	0.1		
PHF	.000	.000	.000	.000	.000	.918	.469	.925	.696	.000	.779	.798	.799	.886	.250	.907	.916



MARKS TRAFFIC DATA

CITY OF OAKLEY

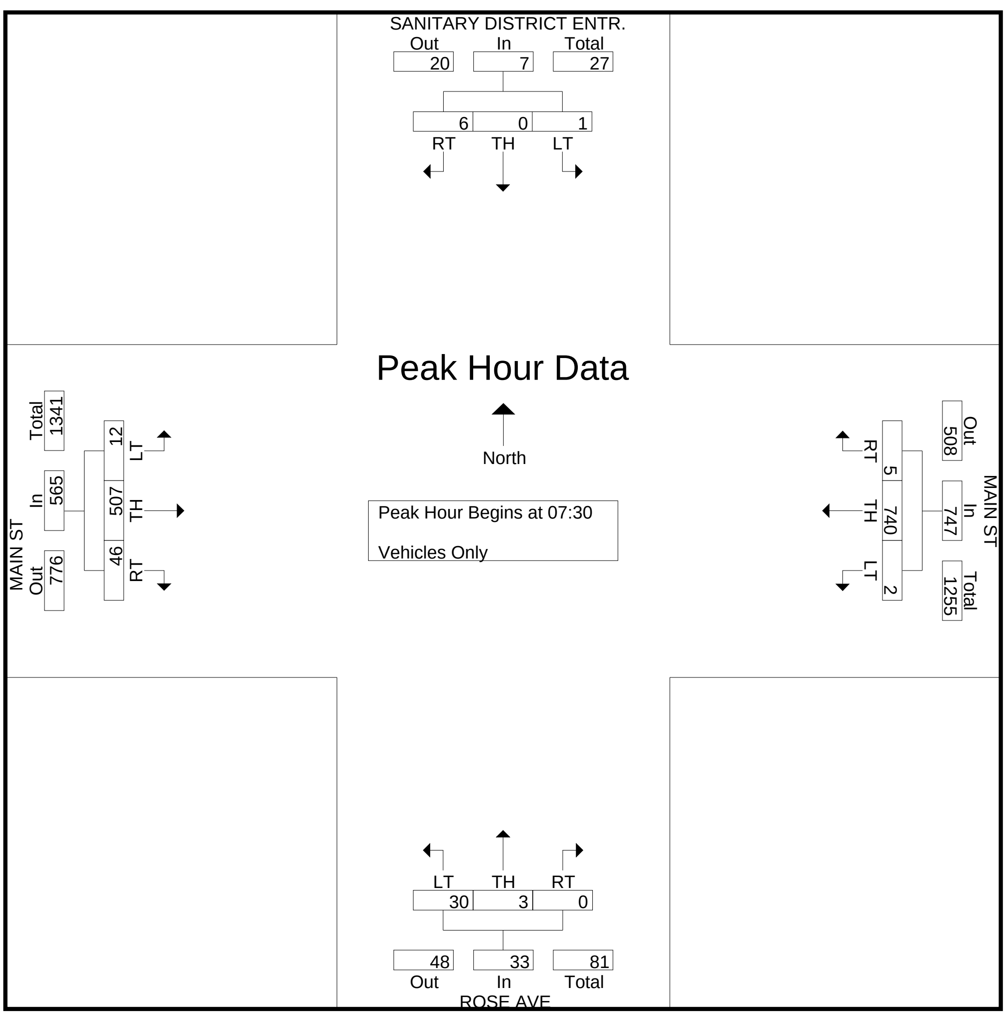
fp
Mietek 916-806-0250

File Name : rose-main-a
Site Code : 6
Start Date : 11/18/2008
Page No : 1

Groups Printed- Vehicles Only

	SANITARY DISTRICT ENTR. Southbound				MAIN ST Westbound				ROSE AVE Northbound				MAIN ST Eastbound				
Start Time	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	Int. Total
07:00	0	0	0	0	3	106	1	110	0	0	7	7	5	72	0	77	194
07:15	0	0	0	0	2	140	0	142	0	0	1	1	1	74	0	75	218
07:30	0	0	0	0	1	152	0	153	0	2	9	11	8	99	1	108	272
07:45	0	0	0	0	4	191	1	196	0	1	6	7	16	126	7	149	352
Total	0	0	0	0	10	589	2	601	0	3	23	26	30	371	8	409	1036
08:00	2	0	0	2	0	193	0	193	0	0	8	8	8	154	3	165	368
08:15	4	0	1	5	0	204	1	205	0	0	7	7	14	128	1	143	360
08:30	0	0	3	3	0	132	0	132	0	1	6	7	13	89	1	103	245
08:45	1	0	1	2	0	96	0	96	0	0	5	5	9	77	1	87	190
Total	7	0	5	12	0	625	1	626	0	1	26	27	44	448	6	498	1163
Grand Total	7	0	5	12	10	1214	3	1227	0	4	49	53	74	819	14	907	2199
Apprch %	58.3	0	41.7		0.8	98.9	0.2		0	7.5	92.5		8.2	90.3	1.5		
Total %	0.3	0	0.2	0.5	0.5	55.2	0.1	55.8	0	0.2	2.2	2.4	3.4	37.2	0.6	41.2	

	SANITARY DISTRICT ENTR. Southbound				MAIN ST Westbound				ROSE AVE Northbound				MAIN ST Eastbound				
Start Time	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30																	
07:30	0	0	0	0	1	152	0	153	0	**2**	**9**	**11**	8	99	1	108	272
07:45	0	0	0	0	**4**	191	**1**	196	0	1	6	7	**16**	126	**7**	149	352
08:00	2	0	0	2	0	193	0	193	0	0	8	8	8	**154**	3	**165**	**368**
08:15	**4**	0	**1**	**5**	0	**204**	1	**205**	0	0	7	7	14	128	1	143	360
Total Volume	6	0	1	7	5	740	2	747	0	3	30	33	46	507	12	565	1352
% App. Total	85.7	0	14.3		0.7	99.1	0.3		0	9.1	90.9		8.1	89.7	2.1		
PHF	.375	.000	.250	.350	.313	.907	.500	.911	.000	.375	.833	.750	.719	.823	.429	.856	.918



CITY OF OAKLEY

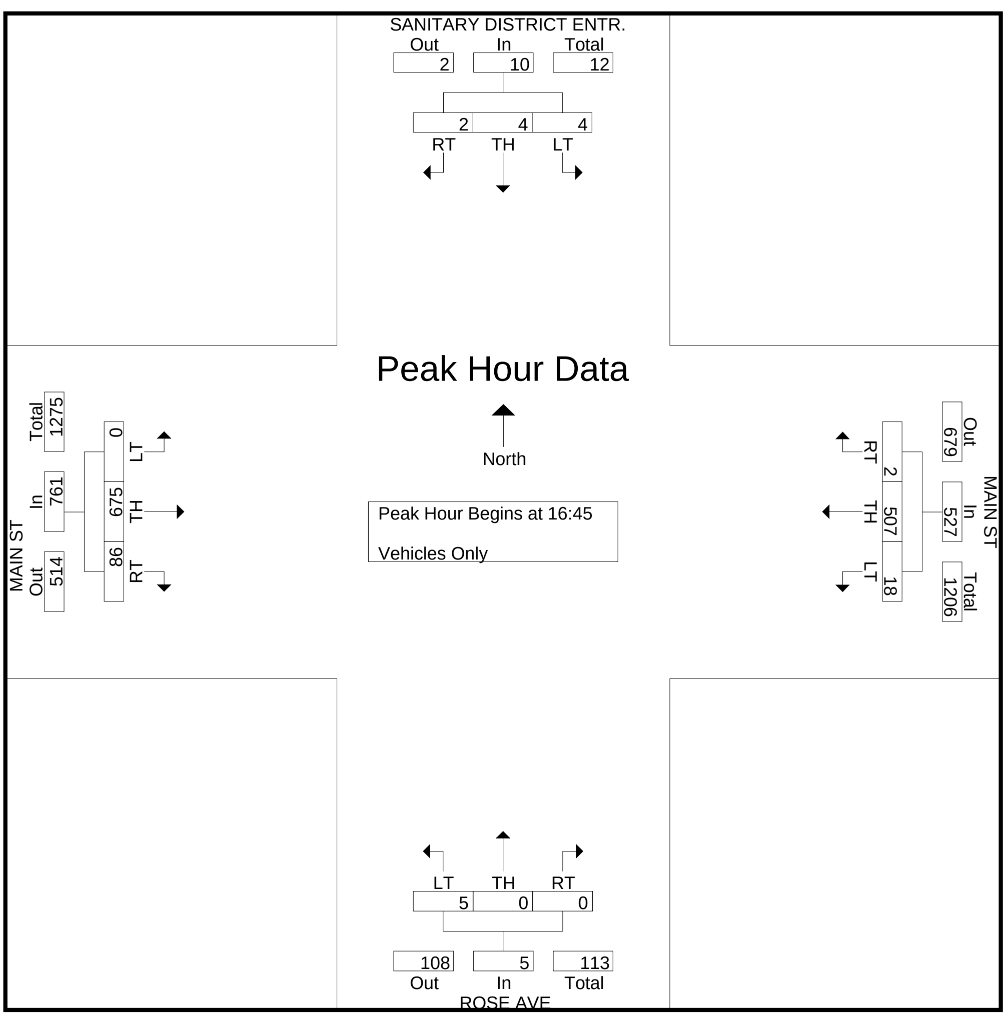
fp
Mietek 916-806-0250

File Name : rose-main-p
Site Code : 6
Start Date : 11/18/2008
Page No : 1

Groups Printed- Vehicles Only

	SANITARY DISTRICT ENTR. Southbound				MAIN ST Westbound				ROSE AVE Northbound				MAIN ST Eastbound				
Start Time	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	Int. Total
16:00	0	1	0	1	1	131	1	133	1	0	3	4	13	153	3	169	307
16:15	2	0	0	2	1	131	4	136	0	0	0	0	18	147	0	165	303
16:30	9	0	1	10	1	126	2	129	0	0	5	5	14	156	0	170	314
16:45	1	0	4	5	2	109	6	117	0	0	0	0	22	160	0	182	304
Total	12	1	5	18	5	497	13	515	1	0	8	9	67	616	3	686	1228
17:00	0	1	0	1	0	123	5	128	0	0	0	0	23	199	0	222	351
17:15	1	3	0	4	0	141	2	143	0	0	1	1	21	154	0	175	323
17:30	0	0	0	0	0	134	5	139	0	0	4	4	20	162	0	182	325
17:45	0	0	0	0	1	102	4	107	0	0	3	3	18	130	0	148	258
Total	1	4	0	5	1	500	16	517	0	0	8	8	82	645	0	727	1257
Grand Total	13	5	5	23	6	997	29	1032	1	0	16	17	149	1261	3	1413	2485
Apprch %	56.5	21.7	21.7		0.6	96.6	2.8		5.9	0	94.1		10.5	89.2	0.2		
Total %	0.5	0.2	0.2	0.9	0.2	40.1	1.2	41.5	0	0	0.6	0.7	6	50.7	0.1	56.9	

	SANITARY DISTRICT ENTR. Southbound				MAIN ST Westbound				ROSE AVE Northbound				MAIN ST Eastbound				
Start Time	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 16:45																	
16:45	**1**	0	**4**	**5**	**2**	109	**6**	117	0	0	0	0	22	160	0	182	304
17:00	0	1	0	1	0	123	5	128	0	0	0	0	**23**	**199**	0	**222**	**351**
17:15	1	**3**	0	4	0	**141**	2	**143**	0	0	1	1	21	154	0	175	323
17:30	0	0	0	0	0	134	5	139	0	0	**4**	**4**	20	162	0	182	325
Total Volume	2	4	4	10	2	507	18	527	0	0	5	5	86	675	0	761	1303
% App. Total	20	40	40		0.4	96.2	3.4		0	0	100		11.3	88.7	0		
PHF	.500	.333	.250	.500	.250	.899	.750	.921	.000	.000	.313	.313	.935	.848	.000	.857	.928



MARKS TRAFFIC DATA

CITY OF OAKLEY

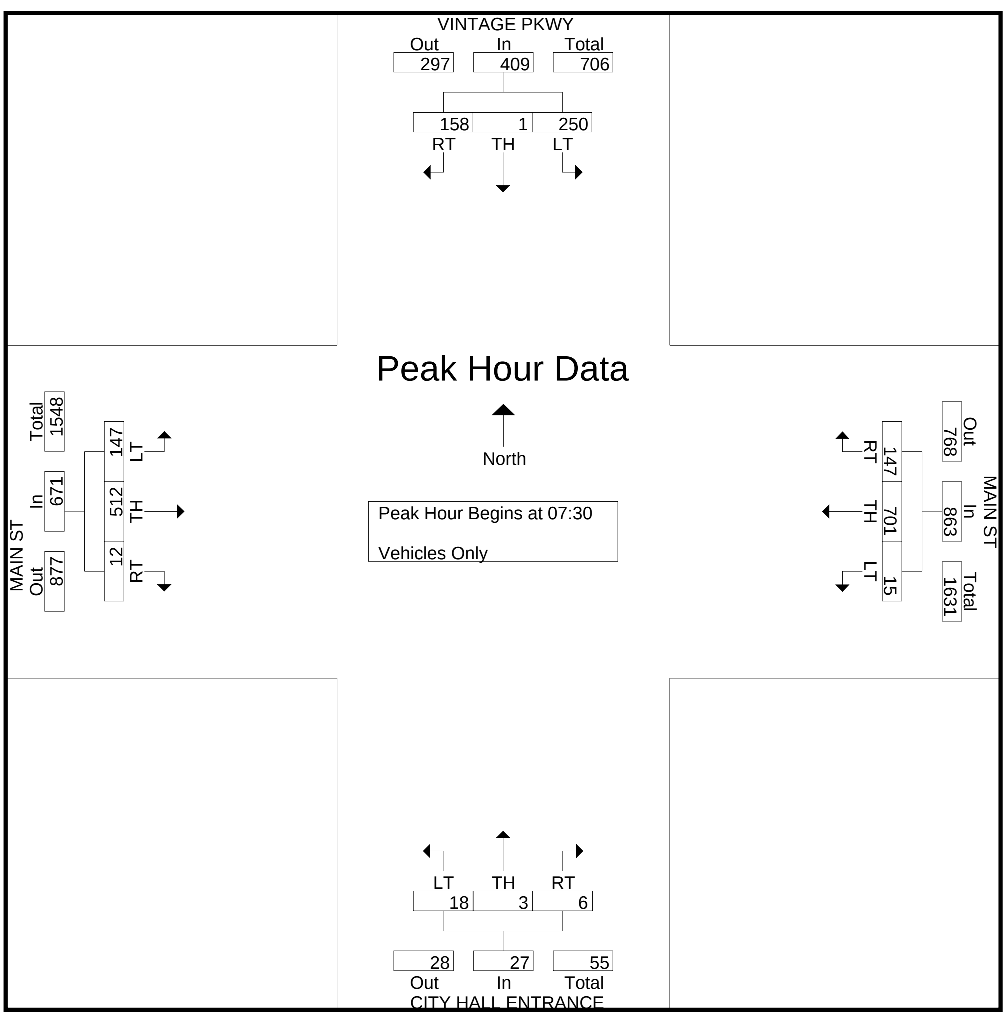
fp
Mietek 916-806-0250

File Name : vintage-main-a
Site Code : 3
Start Date : 11/18/2008
Page No : 1

Groups Printed- Vehicles Only

	VINTAGE PKWY Southbound				MAIN ST Westbound				CITY HALL ENTRANCE Northbound				MAIN ST Eastbound				
Start Time	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	Int. Total
07:00	9	1	19	29	9	121	3	133	0	0	3	3	2	70	9	81	246
07:15	19	0	28	47	3	134	3	140	1	0	3	4	1	79	17	97	288
07:30	30	0	65	95	25	160	2	187	2	0	1	3	1	99	21	121	406
07:45	37	0	63	100	29	181	6	216	1	3	6	10	5	135	24	164	490
Total	95	1	175	271	66	596	14	676	4	3	13	20	9	383	71	463	1430
08:00	40	1	66	107	47	182	4	233	0	0	5	5	4	140	44	188	533
08:15	51	0	56	107	46	178	3	227	3	0	6	9	2	138	58	198	541
08:30	25	0	29	54	23	151	3	177	2	2	5	9	8	92	10	110	350
08:45	20	0	22	42	11	116	2	129	2	1	4	7	2	91	12	105	283
Total	136	1	173	310	127	627	12	766	7	3	20	30	16	461	124	601	1707
Grand Total	231	2	348	581	193	1223	26	1442	11	6	33	50	25	844	195	1064	3137
Apprch %	39.8	0.3	59.9		13.4	84.8	1.8		22	12	66		2.3	79.3	18.3		
Total %	7.4	0.1	11.1	18.5	6.2	39	0.8	46	0.4	0.2	1.1	1.6	0.8	26.9	6.2	33.9	

	VINTAGE PKWY Southbound				MAIN ST Westbound				CITY HALL ENTRANCE Northbound				MAIN ST Eastbound				
Start Time	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30																	
07:30	30	0	65	95	25	160	2	187	2	0	1	3	1	99	21	121	406
07:45	37	0	63	100	29	181	**6**	216	1	**3**	**6**	**10**	**5**	135	24	164	490
08:00	40	**1**	**66**	**107**	**47**	**182**	4	**233**	0	0	5	5	4	**140**	44	188	533
08:15	**51**	0	56	107	46	178	3	227	**3**	0	6	9	2	138	**58**	**198**	**541**
Total Volume	158	1	250	409	147	701	15	863	6	3	18	27	12	512	147	671	1970
% App. Total	38.6	0.2	61.1		17	81.2	1.7		22.2	11.1	66.7		1.8	76.3	21.9		
PHF	.775	.250	.947	.956	.782	.963	.625	.926	.500	.250	.750	.675	.600	.914	.634	.847	.910



MARKS TRAFFIC DATA

CITY OF OAKLEY

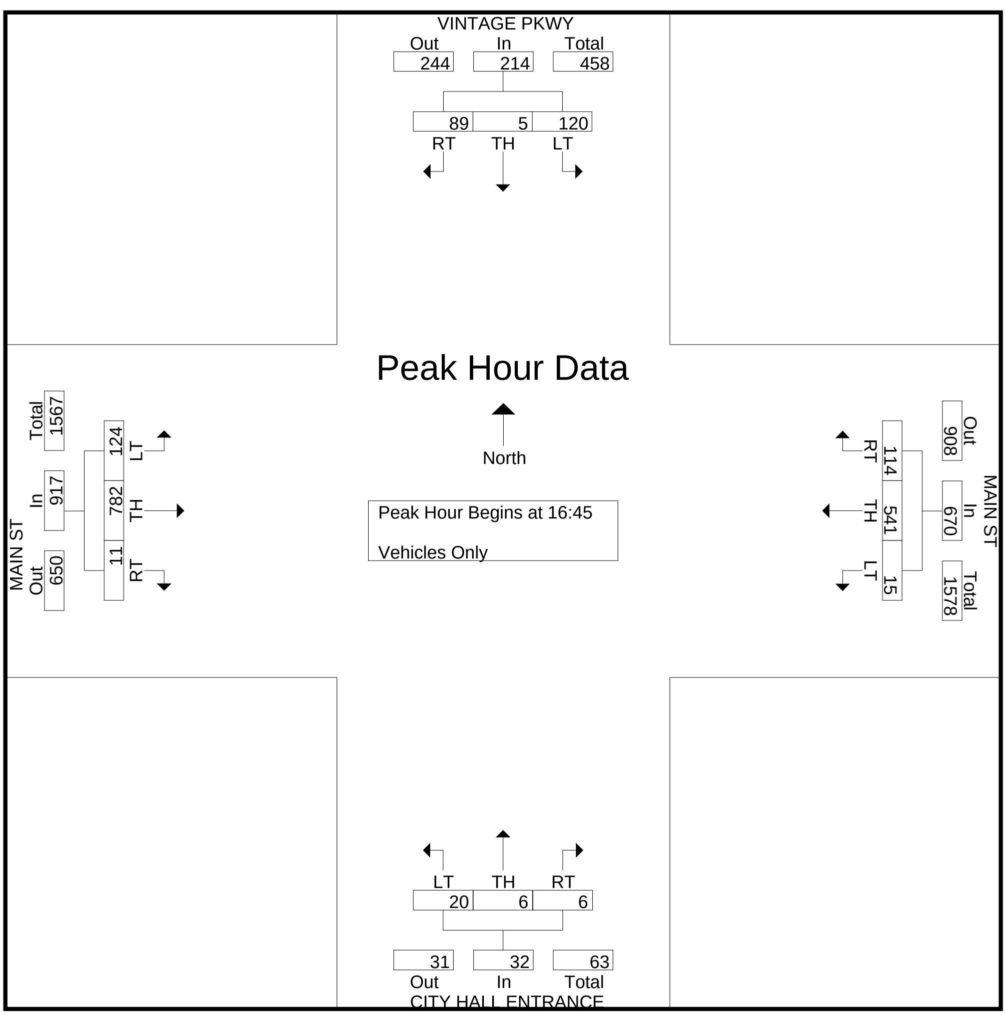
fp
Mietek 916-806-0250

File Name : vintage-main-p
Site Code : 3
Start Date : 11/18/2008
Page No : 1

Groups Printed- Vehicles Only

	VINTAGE PKWY Southbound				MAIN ST Westbound				CITY HALL ENTRANCE Northbound				MAIN ST Eastbound				
Start Time	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	Int. Total
16:00	29	1	31	61	24	139	1	164	2	1	3	6	6	180	29	215	446
16:15	14	0	35	49	31	137	2	170	2	0	3	5	1	163	23	187	411
16:30	22	0	33	55	26	147	1	174	1	0	2	3	3	184	21	208	440
16:45	24	0	23	47	22	116	2	140	2	1	3	6	4	195	21	220	413
Total	89	1	122	212	103	539	6	648	7	2	11	20	14	722	94	830	1710
17:00	30	0	41	71	32	134	7	173	1	2	12	15	3	205	31	239	498
17:15	17	2	30	49	27	138	2	167	2	2	4	8	3	184	31	218	442
17:30	18	3	26	47	33	153	4	190	1	1	1	3	1	198	41	240	480
17:45	20	2	31	53	27	109	3	139	2	2	4	8	1	165	27	193	393
Total	85	7	128	220	119	534	16	669	6	7	21	34	8	752	130	890	1813
Grand Total	174	8	250	432	222	1073	22	1317	13	9	32	54	22	1474	224	1720	3523
Apprch %	40.3	1.9	57.9		16.9	81.5	1.7		24.1	16.7	59.3		1.3	85.7	13		
Total %	4.9	0.2	7.1	12.3	6.3	30.5	0.6	37.4	0.4	0.3	0.9	1.5	0.6	41.8	6.4	48.8	

	VINTAGE PKWY Southbound				MAIN ST Westbound				CITY HALL ENTRANCE Northbound				MAIN ST Eastbound				
Start Time	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 16:45																	
16:45	24	0	23	47	22	116	2	140	**2**	1	3	6	**4**	195	21	220	413
17:00	**30**	0	**41**	**71**	32	134	**7**	173	1	**2**	**12**	**15**	3	**205**	31	239	**498**
17:15	17	2	30	49	27	138	2	167	2	2	4	8	3	184	31	218	442
17:30	18	**3**	26	47	**33**	**153**	4	**190**	1	1	1	3	1	198	**41**	**240**	480
Total Volume	89	5	120	214	114	541	15	670	6	6	20	32	11	782	124	917	1833
% App. Total	41.6	2.3	56.1		17	80.7	2.2		18.8	18.8	62.5		1.2	85.3	13.5		
PHF	.742	.417	.732	.754	.864	.884	.536	.882	.750	.750	.417	.533	.688	.954	.756	.955	.920



APPENDIX B:
INTERSECTION LOS CALCULATION SHEETS

Existing Conditions

Cumulative No Project Conditions

Cumulative With Project Conditions

Cumulative with Project Mitigations

HCM SYNCHRO ANALYSIS

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
Frpb, ped/bikes	1.00	1.00	0.98		1.00	0.99	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	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	0.85	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	1713	1551		1813	1561	1770	3526		1770	1863	1545
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	1713	1551		1813	1561	1770	3526		1770	1863	1545
Volume (vph)	51	10	88	10	9	15	146	304	7	26	279	73
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	59	12	102	12	10	17	170	353	8	30	324	85
RTOR Reduction (vph)	0	0	95	0	0	16	0	1	0	0	0	43
Lane Group Flow (vph)	35	36	7	0	22	1	170	360	0	30	324	42
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
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		4.2	4.2	7.1	38.2		1.7	32.8	32.8
Effective Green, g (s)	4.8	4.8	4.8		5.2	5.2	8.1	39.2		2.7	33.8	33.8
Actuated g/C Ratio	0.07	0.07	0.07		0.08	0.08	0.12	0.58		0.04	0.50	0.50
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)	119	121	110		139	120	211	2036		70	927	769
v/s Ratio Prot	0.02	c0.02			c0.01		c0.10	0.10		0.02	c0.17	
v/s Ratio Perm			0.00			0.00						0.03
v/c Ratio	0.29	0.30	0.07		0.16	0.01	0.81	0.18		0.43	0.35	0.06
Uniform Delay, d1	29.9	29.9	29.5		29.3	29.0	29.1	6.8		31.8	10.4	8.8
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	1.4	1.4	0.3		0.5	0.0	19.6	0.0		4.2	0.2	0.0
Delay (s)	31.3	31.3	29.7		29.8	29.0	48.8	6.8		36.0	10.6	8.8
Level of Service	C	C	C		C	C	D	A		D	B	A
Approach Delay (s)		30.4			29.5			20.2			12.0	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	19.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	67.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	41.4%	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		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
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00	0.99		1.00	0.98
Flpb, ped/bikes	1.00	1.00	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	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)	1770	3438	1562	1770	3421		3433	1863	1562		1826	1551
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)	1770	3438	1562	1770	3421		3433	1863	1562		1826	1551
Volume (vph)	12	434	184	158	672	24	240	18	112	25	36	21
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)	12	452	192	165	700	25	250	19	117	26	38	22
RTOR Reduction (vph)	0	0	133	0	2	0	0	0	93	0	0	20
Lane Group Flow (vph)	12	452	59	165	723	0	250	19	24	0	64	2
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	2%	5%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
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)	0.9	17.9	17.9	8.4	25.4		11.4	11.4	11.4		4.3	4.3
Effective Green, g (s)	1.9	18.9	18.9	9.4	26.4		12.4	12.4	12.4		4.3	4.3
Actuated g/C Ratio	0.03	0.31	0.31	0.15	0.43		0.20	0.20	0.20		0.07	0.07
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)	55	1065	484	273	1481		698	379	318		129	109
v/s Ratio Prot	0.01	0.13		c0.09	c0.21		c0.07	0.01			c0.04	
v/s Ratio Perm			0.04						0.02			0.00
v/c Ratio	0.22	0.42	0.12	0.60	0.49		0.36	0.05	0.07		0.50	0.01
Uniform Delay, d1	28.8	16.7	15.1	24.1	12.4		20.9	19.6	19.7		27.3	26.4
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	2.0	0.3	0.1	3.7	0.3		0.3	0.1	0.1		3.0	0.1
Delay (s)	30.8	17.0	15.2	27.8	12.7		21.2	19.6	19.8		30.3	26.4
Level of Service	C	B	B	C	B		C	B	B		C	C
Approach Delay (s)		16.7			15.5			20.7			29.3	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM Average Control Delay	17.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	61.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	46.5%	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
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Frt	1.00	1.00		1.00	0.97			0.97			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.95	1.00
Satd. Flow (prot)	1770	3429		1770	3351			1746			1767	1562
Flt Permitted	0.95	1.00		0.95	1.00			0.79			0.70	1.00
Satd. Flow (perm)	1770	3429		1770	3351			1431			1308	1562
Volume (vph)	147	512	12	15	701	147	18	3	6	250	1	158
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	162	563	13	16	770	162	20	3	7	275	1	174
RTOR Reduction (vph)	0	1	0	0	19	0	0	5	0	0	0	124
Lane Group Flow (vph)	162	575	0	16	913	0	0	25	0	0	276	50
Confl. Peds. (#/hr)	2					2				2		2
Heavy Vehicles (%)	2%	5%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot			Prot			Perm			Perm		Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		6
Actuated Green, G (s)	8.3	32.9		0.6	25.2			18.9			18.9	18.9
Effective Green, g (s)	8.3	33.9		0.6	26.2			18.9			18.9	18.9
Actuated g/C Ratio	0.13	0.52		0.01	0.40			0.29			0.29	0.29
Clearance Time (s)	4.0	5.0		4.0	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
Lane Grp Cap (vph)	225	1777		16	1342			414			378	451
v/s Ratio Prot	c0.09	0.17		0.01	c0.27							
v/s Ratio Perm								0.02			c0.21	0.03
v/c Ratio	0.72	0.32		1.00	0.68			0.06			0.73	0.11
Uniform Delay, d1	27.4	9.1		32.4	16.2			16.8			21.0	17.1
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Incremental Delay, d2	10.5	0.1		225.0	1.4			0.1			7.1	0.1
Delay (s)	38.0	9.2		257.4	17.6			16.9			28.0	17.2
Level of Service	D	A		F	B			B			C	B
Approach Delay (s)		15.5			21.6			16.9			23.8	
Approach LOS		B			C			B			C	

Intersection Summary			
HCM Average Control Delay	19.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	65.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	678	78	38	859	23	10
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	762	88	43	965	26	11
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)	810			707		
pX, platoon unblocked			0.81		0.81	0.81
vC, conflicting volume			851		1860	810
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			817		1720	766
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		65	97
cM capacity (veh/h)			658		74	326

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	849	43	965	37
Volume Left	0	43	0	26
Volume Right	88	0	0	11
cSH	1700	658	1700	96
Volume to Capacity	0.50	0.06	0.57	0.38
Queue Length 95th (ft)	0	5	0	39
Control Delay (s)	0.0	10.8	0.0	64.0
Lane LOS		B		F
Approach Delay (s)	0.0	0.5		64.0
Approach LOS				F

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	55.9%	ICU Level of Service	B
Analysis Period (min)	15		

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		1.00	1.00	1.00	1.00		1.00	1.00				
Frpb, ped/bikes		1.00	0.98	1.00	1.00		1.00	0.99				
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00	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)		1810	1546	1767	1810		1762	1561				
Flt Permitted		1.00	1.00	0.95	1.00		0.76	1.00				
Satd. Flow (perm)		1810	1546	1767	1810		1405	1561				
Volume (vph)	0	556	118	12	726	0	151	0	33	0	0	0
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)	0	604	128	13	789	0	164	0	36	0	0	0
RTOR Reduction (vph)	0	0	51	0	0	0	0	29	0	0	0	0
Lane Group Flow (vph)	0	604	77	13	789	0	164	7	0	0	0	0
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	2%	5%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4				2			6		
Actuated Green, G (s)		37.9	37.9	0.7	42.6		12.5	12.5				
Effective Green, g (s)		38.9	38.9	0.7	43.6		13.0	13.0				
Actuated g/C Ratio		0.60	0.60	0.01	0.67		0.20	0.20				
Clearance Time (s)		5.0	5.0	4.0	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)		1090	931	19	1222		283	314				
v/s Ratio Prot		0.33		0.01	c0.44			0.00				
v/s Ratio Perm			0.05				c0.12					
v/c Ratio		0.55	0.08	0.68	0.65		0.58	0.02				
Uniform Delay, d1		7.7	5.4	31.8	6.0		23.3	20.7				
Progression Factor		1.00	1.00	1.00	1.00		1.00	1.00				
Incremental Delay, d2		0.6	0.0	69.9	1.2		2.9	0.0				
Delay (s)		8.3	5.4	101.7	7.2		26.2	20.7				
Level of Service		A	A	F	A		C	C				
Approach Delay (s)		7.8			8.8			25.2			0.0	
Approach LOS		A			A			C			A	

Intersection Summary			
HCM Average Control Delay	10.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	64.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	507	46	2	740	30	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	551	50	2	804	33	0
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			603		1364	555
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			603		1364	555
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		80	100
cM capacity (veh/h)			973		162	529

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	551	50	2	804	33
Volume Left	0	0	2	0	33
Volume Right	0	50	0	0	0
cSH	1700	1700	973	1700	162
Volume to Capacity	0.32	0.03	0.00	0.47	0.20
Queue Length 95th (ft)	0	0	0	0	18
Control Delay (s)	0.0	0.0	8.7	0.0	32.8
Lane LOS			A		D
Approach Delay (s)	0.0		0.0		32.8
Approach LOS					D

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	49.6%	ICU Level of Service	A
Analysis Period (min)	15		

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	1.00	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		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	3414		1770	1863	1546	1770	3438	1561	3433	3433	
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	3414		1770	1863	1546	1770	3438	1561	3433	3433	
Volume (vph)	58	212	55	331	221	417	65	264	259	274	241	3
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	64	233	60	364	243	458	71	290	285	301	265	3
RTOR Reduction (vph)	0	24	0	0	0	284	0	0	204	0	1	0
Lane Group Flow (vph)	64	269	0	364	243	174	71	290	81	301	267	0
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	5%	2%	2%	5%	2%
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)	6.4	14.4		22.0	30.0	30.0	6.5	25.6	25.6	11.7	30.8	
Effective Green, g (s)	6.4	14.4		22.0	30.0	30.0	6.5	25.6	25.6	11.7	30.8	
Actuated g/C Ratio	0.07	0.16		0.25	0.33	0.33	0.07	0.29	0.29	0.13	0.34	
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)	126	548		434	623	517	128	981	446	448	1179	
v/s Ratio Prot	0.04	c0.08		c0.21	0.13		0.04	c0.08		c0.09	0.08	
v/s Ratio Perm						0.11			0.05			
v/c Ratio	0.51	0.49		0.84	0.39	0.34	0.55	0.30	0.18	0.67	0.23	
Uniform Delay, d1	40.1	34.3		32.2	22.8	22.4	40.2	25.0	24.2	37.2	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	3.2	0.7		13.3	0.4	0.4	5.1	0.8	0.9	3.9	0.4	
Delay (s)	43.3	35.0		45.4	23.3	22.8	45.3	25.8	25.1	41.1	21.4	
Level of Service	D	D		D	C	C	D	C	C	D	C	
Approach Delay (s)		36.5			30.6			27.6			31.8	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	30.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	89.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	67.2%	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												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	25	133	114	74	185	89	79	173	92	68	155	52
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	27	143	123	80	199	96	85	186	99	73	167	56

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	292	374	271	99	240	56
Volume Left (vph)	27	80	85	0	73	0
Volume Right (vph)	123	96	0	99	0	56
Hadj (s)	-0.20	-0.08	0.19	-0.67	0.19	-0.67
Departure Headway (s)	7.0	6.8	7.8	7.0	8.0	7.1
Degree Utilization, x	0.57	0.71	0.59	0.19	0.53	0.11
Capacity (veh/h)	471	494	431	480	411	462
Control Delay (s)	18.7	25.0	20.3	10.4	18.5	9.8
Approach Delay (s)	18.7	25.0	17.7		16.9	
Approach LOS	C	C	C		C	

Intersection Summary			
Delay	19.8		
HCM Level of Service	C		
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		

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
Frpb, ped/bikes	1.00	1.00	0.98		1.00	0.99	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	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	0.85	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	1736	1554		1803	1561	1770	3527		1770	1863	1545
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	1736	1554		1803	1561	1770	3527		1770	1863	1545
Volume (vph)	58	26	157	67	35	75	99	274	6	120	353	52
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)	62	28	167	71	37	80	105	291	6	128	376	55
RTOR Reduction (vph)	0	0	151	0	0	69	0	1	0	0	0	31
Lane Group Flow (vph)	44	46	16	0	108	11	105	296	0	128	376	24
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
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)	7.3	7.3	7.3		9.9	9.9	8.7	32.2		9.6	33.1	33.1
Effective Green, g (s)	7.3	7.3	7.3		10.9	10.9	9.7	33.2		10.6	34.1	34.1
Actuated g/C Ratio	0.09	0.09	0.09		0.14	0.14	0.12	0.43		0.14	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)	157	162	145		252	218	220	1501		241	814	675
v/s Ratio Prot	0.03	c0.03			c0.06		0.06	0.08		c0.07	c0.20	
v/s Ratio Perm			0.01			0.01						0.02
v/c Ratio	0.28	0.28	0.11		0.43	0.05	0.48	0.20		0.53	0.46	0.04
Uniform Delay, d1	32.9	32.9	32.4		30.7	29.1	31.8	14.0		31.4	15.5	12.5
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	1.0	1.0	0.3		1.2	0.1	1.6	0.1		2.2	0.4	0.0
Delay (s)	33.9	33.9	32.7		31.9	29.2	33.4	14.1		33.6	15.9	12.6
Level of Service	C	C	C		C	C	C	B		C	B	B
Approach Delay (s)		33.1			30.7			19.2			19.6	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	23.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	78.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	46.5%	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		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
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00	0.99		1.00	0.97
Flpb, ped/bikes	1.00	1.00	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	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)	1770	3438	1561	1770	3423		3433	1863	1561		1826	1535
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)	1770	3438	1561	1770	3423		3433	1863	1561		1826	1535
Volume (vph)	25	785	322	211	386	12	240	29	138	16	23	15
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)	27	853	350	229	420	13	261	32	150	17	25	16
RTOR Reduction (vph)	0	0	211	0	2	0	0	0	125	0	0	15
Lane Group Flow (vph)	27	853	139	229	431	0	261	32	25	0	42	1
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	2%	5%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
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)	1.8	29.0	29.0	13.5	40.7		11.8	11.8	11.8		2.4	2.4
Effective Green, g (s)	2.8	30.0	30.0	14.5	41.7		12.8	12.8	12.8		2.4	2.4
Actuated g/C Ratio	0.04	0.40	0.40	0.19	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)	65	1362	619	339	1886		580	315	264		58	49
v/s Ratio Prot	0.02	c0.25		c0.13	0.13		c0.08	0.02			c0.02	
v/s Ratio Perm			0.09						0.02			0.00
v/c Ratio	0.42	0.63	0.22	0.68	0.23		0.45	0.10	0.10		0.72	0.01
Uniform Delay, d1	35.6	18.3	15.1	28.4	8.7		28.3	26.6	26.6		36.3	35.5
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	4.3	0.9	0.2	5.2	0.1		0.6	0.1	0.2		35.9	0.1
Delay (s)	39.9	19.3	15.3	33.7	8.8		28.8	26.7	26.7		72.2	35.6
Level of Service	D	B	B	C	A		C	C	C		E	D
Approach Delay (s)		18.6			17.4			28.0			62.1	
Approach LOS		B			B			C			E	

Intersection Summary			
HCM Average Control Delay	21.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	75.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	57.2%	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
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Frt	1.00	1.00		1.00	0.97			0.97			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.95	1.00
Satd. Flow (prot)	1770	3432		1770	3352			1760			1772	1562
Flt Permitted	0.95	1.00		0.95	1.00			0.82			0.71	1.00
Satd. Flow (perm)	1770	3432		1770	3352			1483			1314	1562
Volume (vph)	124	782	11	15	541	114	20	6	6	120	5	89
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)	135	850	12	16	588	124	22	7	7	130	5	97
RTOR Reduction (vph)	0	1	0	0	19	0	0	5	0	0	0	75
Lane Group Flow (vph)	135	861	0	16	693	0	0	31	0	0	135	22
Confl. Peds. (#/hr)	2					2				2		2
Heavy Vehicles (%)	2%	5%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot			Prot			Perm			Perm		Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		6
Actuated Green, G (s)	7.4	25.3		0.9	18.8			11.3			11.3	11.3
Effective Green, g (s)	7.4	26.3		0.9	19.8			11.3			11.3	11.3
Actuated g/C Ratio	0.15	0.52		0.02	0.39			0.22			0.22	0.22
Clearance Time (s)	4.0	5.0		4.0	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
Lane Grp Cap (vph)	259	1787		32	1314			332			294	350
v/s Ratio Prot	c0.08	c0.25		0.01	0.21							
v/s Ratio Perm								0.02			c0.10	0.01
v/c Ratio	0.52	0.48		0.50	0.53			0.09			0.46	0.06
Uniform Delay, d1	19.9	7.7		24.6	11.8			15.5			17.0	15.4
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Incremental Delay, d2	1.9	0.2		11.8	0.4			0.1			1.1	0.1
Delay (s)	21.8	7.9		36.3	12.1			15.7			18.1	15.5
Level of Service	C	A		D	B			B			B	B
Approach Delay (s)		9.8			12.7			15.7			17.0	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM Average Control Delay	11.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	50.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	877	35	12	708	9	2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	974	39	13	787	10	2
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)	820			697		
pX, platoon unblocked			0.57		0.67	0.57
vC, conflicting volume			1015		1811	998
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1027		1776	996
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		83	99
cM capacity (veh/h)			384		58	168

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	1013	13	787	12
Volume Left	0	13	0	10
Volume Right	39	0	0	2
cSH	1700	384	1700	66
Volume to Capacity	0.60	0.03	0.46	0.18
Queue Length 95th (ft)	0	3	0	16
Control Delay (s)	0.0	14.7	0.0	71.4
Lane LOS		B		F
Approach Delay (s)	0.0	0.2		71.4
Approach LOS				F

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		

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				
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	0.99				
Flpb, ped/bikes	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				
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00				
Satd. Flow (prot)	1767	1810	1546	1768	1810		1762	1561				
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.76	1.00				
Satd. Flow (perm)	1767	1810	1546	1768	1810		1405	1561				
Volume (vph)	1	695	131	15	525	0	162	0	39	0	0	0
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)	1	755	142	16	571	0	176	0	42	0	0	0
RTOR Reduction (vph)	0	0	56	0	0	0	0	33	0	0	0	0
Lane Group Flow (vph)	1	755	86	16	571	0	176	9	0	0	0	0
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	2%	5%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4				2			6		
Actuated Green, G (s)	0.5	38.5	38.5	0.5	38.5		12.6	12.6				
Effective Green, g (s)	0.5	39.5	39.5	0.5	39.5		13.6	13.6				
Actuated g/C Ratio	0.01	0.60	0.60	0.01	0.60		0.21	0.21				
Clearance Time (s)	4.0	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				
Lane Grp Cap (vph)	13	1090	931	13	1090		291	324				
v/s Ratio Prot	0.00	c0.42		c0.01	0.32			0.01				
v/s Ratio Perm			0.06				c0.13					
v/c Ratio	0.08	0.69	0.09	1.23	0.52		0.60	0.03				
Uniform Delay, d1	32.3	8.9	5.5	32.5	7.6		23.6	20.7				
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00				
Incremental Delay, d2	2.5	1.9	0.0	333.7	0.5		3.5	0.0				
Delay (s)	34.8	10.8	5.5	366.2	8.0		27.1	20.8				
Level of Service	C	B	A	F	A		C	C				
Approach Delay (s)		10.0			17.8			25.9			0.0	
Approach LOS		B			B			C			A	

Intersection Summary			
HCM Average Control Delay	14.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	65.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	675	86	18	597	5	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	726	92	19	642	5	0
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			820		1410	730
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			820		1410	730
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		96	100
cM capacity (veh/h)			807		148	421

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	726	92	19	642	5
Volume Left	0	0	19	0	5
Volume Right	0	92	0	0	0
cSH	1700	1700	807	1700	148
Volume to Capacity	0.43	0.05	0.02	0.38	0.04
Queue Length 95th (ft)	0	0	2	0	3
Control Delay (s)	0.0	0.0	9.6	0.0	30.2
Lane LOS			A		D
Approach Delay (s)	0.0		0.3		30.2
Approach LOS					D

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	46.2%	ICU Level of Service	A
Analysis Period (min)	15		

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	1.00	1.00	0.95	1.00	0.97	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	1.00	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	3362		1770	1863	1547	1770	3438	1561	3433	3419	
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	3362		1770	1863	1547	1770	3438	1561	3433	3419	
Volume (vph)	39	127	52	134	131	217	71	270	134	306	372	15
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)	40	131	54	138	135	224	73	278	138	315	384	15
RTOR Reduction (vph)	0	46	0	0	0	177	0	0	87	0	2	0
Lane Group Flow (vph)	40	139	0	138	135	47	73	278	51	315	397	0
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	5%	2%	2%	5%	2%
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)	4.4	11.2		9.4	16.2	16.2	7.0	28.5	28.5	12.1	33.6	
Effective Green, g (s)	4.4	11.2		9.4	16.2	16.2	7.0	28.5	28.5	12.1	33.6	
Actuated g/C Ratio	0.06	0.15		0.12	0.21	0.21	0.09	0.37	0.37	0.16	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)	101	488		216	391	325	160	1269	576	538	1488	
v/s Ratio Prot	0.02	0.04		c0.08	c0.07		0.04	0.08		c0.09	c0.12	
v/s Ratio Perm						0.03			0.03			
v/c Ratio	0.40	0.28		0.64	0.35	0.14	0.46	0.22	0.09	0.59	0.27	
Uniform Delay, d1	35.1	29.4		32.3	26.0	24.9	33.3	16.7	15.9	30.2	13.9	
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	2.5	0.3		6.1	0.5	0.2	2.1	0.4	0.3	1.6	0.4	
Delay (s)	37.7	29.7		38.4	26.5	25.1	35.4	17.1	16.2	31.9	14.4	
Level of Service	D	C		D	C	C	D	B	B	C	B	
Approach Delay (s)		31.2			29.2			19.6			22.1	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM Average Control Delay	24.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	77.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.9%	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												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	28	121	51	89	146	44	73	180	112	43	167	37
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	32	139	59	102	168	51	84	207	129	49	192	43

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	230	321	291	129	241	43
Volume Left (vph)	32	102	84	0	49	0
Volume Right (vph)	59	51	0	129	0	43
Hadj (s)	-0.09	0.00	0.18	-0.67	0.14	-0.67
Departure Headway (s)	6.8	6.6	7.2	6.4	7.4	6.6
Degree Utilization, x	0.43	0.59	0.58	0.23	0.50	0.08
Capacity (veh/h)	471	509	470	532	443	498
Control Delay (s)	14.9	18.7	18.7	10.0	16.3	8.9
Approach Delay (s)	14.9	18.7	16.0		15.2	
Approach LOS	B	C	C		C	

Intersection Summary			
Delay	16.3		
HCM Level of Service	C		
Intersection Capacity Utilization	64.5%	ICU Level of Service	C
Analysis Period (min)	15		

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
Frpb, ped/bikes	1.00	1.00	0.98		1.00	0.98	1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	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	0.85	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	1697	1547		1804	1560	1770	3527		1770	1863	1543
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	1697	1547		1804	1560	1770	3527		1770	1863	1543
Volume (vph)	130	10	230	20	10	20	660	990	20	50	400	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)	137	11	242	21	11	21	695	1042	21	53	421	63
RTOR Reduction (vph)	0	0	229	0	0	19	0	1	0	0	0	45
Lane Group Flow (vph)	72	76	13	0	32	2	695	1062	0	53	421	18
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
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		6.1	6.1	40.7	62.5		4.8	26.6	26.6
Effective Green, g (s)	5.1	5.1	5.1		7.1	7.1	41.7	63.5		5.8	27.6	27.6
Actuated g/C Ratio	0.05	0.05	0.05		0.07	0.07	0.43	0.65		0.06	0.28	0.28
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)	88	89	81		131	114	757	2297		105	527	437
v/s Ratio Prot	0.04	c0.04			c0.02		c0.39	0.30		0.03	c0.23	
v/s Ratio Perm			0.01			0.00						0.01
v/c Ratio	0.82	0.85	0.16		0.24	0.01	0.92	0.46		0.50	0.80	0.04
Uniform Delay, d1	45.7	45.8	44.1		42.7	41.9	26.3	8.5		44.5	32.4	25.3
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	42.2	50.7	0.9		1.0	0.0	15.9	0.1		3.8	8.3	0.0
Delay (s)	88.0	96.6	45.0		43.6	42.0	42.2	8.6		48.2	40.7	25.4
Level of Service	F	F	D		D	D	D	A		D	D	C
Approach Delay (s)		63.0			43.0			21.9			39.6	
Approach LOS		E			D			C			D	

Intersection Summary			
HCM Average Control Delay	31.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	97.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
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		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
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00	0.99		1.00	0.98
Flpb, ped/bikes	1.00	1.00	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	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)	1770	3438	1560	1770	3427		3433	1863	1560		1837	1548
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)	1770	3438	1560	1770	3427		3433	1863	1560		1837	1548
Volume (vph)	20	810	280	180	890	20	940	30	170	20	50	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	853	295	189	937	21	989	32	179	21	53	63
RTOR Reduction (vph)	0	0	203	0	1	0	0	0	118	0	0	59
Lane Group Flow (vph)	21	853	92	189	957	0	989	32	61	0	74	4
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	2%	5%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
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	29.8	29.8	11.4	39.8		32.7	32.7	32.7		5.6	5.6
Effective Green, g (s)	2.4	30.8	30.8	12.4	40.8		33.7	33.7	33.7		5.6	5.6
Actuated g/C Ratio	0.02	0.31	0.31	0.13	0.41		0.34	0.34	0.34		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)	43	1075	488	223	1420		1175	637	534		104	88
v/s Ratio Prot	0.01	c0.25		c0.11	0.28		c0.29	0.02			c0.04	
v/s Ratio Perm			0.06						0.04			0.00
v/c Ratio	0.49	0.79	0.19	0.85	0.67		0.84	0.05	0.11		0.71	0.04
Uniform Delay, d1	47.4	30.9	24.7	42.1	23.4		29.9	21.7	22.2		45.7	43.9
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	8.5	4.1	0.2	24.6	1.3		5.6	0.0	0.1		20.4	0.2
Delay (s)	55.9	35.0	24.9	66.7	24.7		35.6	21.7	22.3		66.1	44.1
Level of Service	E	D	C	E	C		D	C	C		E	D
Approach Delay (s)		32.9			31.6			33.2			56.0	
Approach LOS		C			C			C			E	

Intersection Summary			
HCM Average Control Delay	33.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	98.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	75.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

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
Frpb, ped/bikes	1.00	1.00	1.00		1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3438	3428		1770	1562
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3438	3428		1770	1562
Volume (vph)	100	960	930	20	70	150
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	1011	979	21	74	158
RTOR Reduction (vph)	0	0	2	0	0	134
Lane Group Flow (vph)	105	1011	998	0	74	24
Confl. Peds. (#/hr)	2			2	2	2
Heavy Vehicles (%)	2%	5%	5%	2%	2%	2%
Turn Type	Prot					Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	6.6	43.2	32.6		9.5	9.5
Effective Green, g (s)	6.6	44.2	33.6		9.5	9.5
Actuated g/C Ratio	0.11	0.72	0.54		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)	189	2463	1867		273	241
v/s Ratio Prot	c0.06	0.29	c0.29		c0.04	
v/s Ratio Perm						0.02
v/c Ratio	0.56	0.41	0.53		0.27	0.10
Uniform Delay, d1	26.2	3.5	9.0		23.0	22.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.5	0.1	0.3		0.5	0.2
Delay (s)	29.7	3.6	9.3		23.6	22.6
Level of Service	C	A	A		C	C
Approach Delay (s)		6.1	9.3		22.9	
Approach LOS		A	A		C	

Intersection Summary			
HCM Average Control Delay	9.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	61.7	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			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	1010	10	10	980	40	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1063	11	11	1032	42	11
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)	820			697		
pX, platoon unblocked			0.32		0.51	0.32
vC, conflicting volume			1076		2125	1072
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1234		2092	1224
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		0	85
cM capacity (veh/h)			182		28	70

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	1074	11	1032	53
Volume Left	0	11	0	42
Volume Right	11	0	0	11
cSH	1700	182	1700	31
Volume to Capacity	0.63	0.06	0.61	1.67
Queue Length 95th (ft)	0	5	0	149
Control Delay (s)	0.0	26.0	0.0	600.5
Lane LOS		D		F
Approach Delay (s)	0.0	0.3		600.5
Approach LOS				F

Intersection Summary			
Average Delay	14.7		
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		

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	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	0.98			0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.99	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)	1767	1810	1544	1770	1806		1760	1544			1669	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.74	1.00			0.89	
Satd. Flow (perm)	1767	1810	1544	1770	1806		1376	1544			1517	
Volume (vph)	10	920	120	30	870	10	100	0	30	10	0	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	968	126	32	916	11	105	0	32	11	0	11
RTOR Reduction (vph)	0	0	36	0	0	0	0	28	0	0	10	0
Lane Group Flow (vph)	11	968	90	32	927	0	105	4	0	0	12	0
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	2%	5%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
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	64.4	64.4	1.8	65.5		11.2	11.2			12.2	
Effective Green, g (s)	0.7	65.4	65.4	1.8	66.5		12.2	12.2			12.2	
Actuated g/C Ratio	0.01	0.72	0.72	0.02	0.73		0.13	0.13			0.13	
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)	14	1295	1105	35	1314		184	206			202	
v/s Ratio Prot	0.01	c0.53		c0.02	0.51			0.00				
v/s Ratio Perm			0.06				c0.08				0.01	
v/c Ratio	0.79	0.75	0.08	0.91	0.71		0.57	0.02			0.06	
Uniform Delay, d1	45.3	8.0	3.9	44.7	7.0		37.1	34.4			34.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	130.6	2.4	0.0	116.7	1.7		4.2	0.0			0.1	
Delay (s)	175.8	10.4	4.0	161.4	8.7		41.4	34.5			34.7	
Level of Service	F	B	A	F	A		D	C			C	
Approach Delay (s)		11.3			13.8			39.8			34.7	
Approach LOS		B			B			D			C	

Intersection Summary			
HCM Average Control Delay	14.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	91.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	1000	30	10	910	20	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1053	32	11	958	21	11
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1086		2051	1072
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1086		2051	1072
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		65	96
cM capacity (veh/h)			641		60	267

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	1084	11	958	32
Volume Left	0	11	0	21
Volume Right	32	0	0	11
cSH	1700	641	1700	81
Volume to Capacity	0.64	0.02	0.56	0.39
Queue Length 95th (ft)	0	1	0	38
Control Delay (s)	0.0	10.7	0.0	75.7
Lane LOS		B		F
Approach Delay (s)	0.0	0.1		75.7
Approach LOS				F

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	65.1%	ICU Level of Service	C
Analysis Period (min)	15		

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	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		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	3403		1770	1770	1476	1770	3438	1575	3433	3428	
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	3403		1770	1770	1476	1770	3438	1575	3433	3428	
Volume (vph)	30	210	60	580	690	430	80	450	220	460	530	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)	32	221	63	611	726	453	84	474	232	484	558	11
RTOR Reduction (vph)	0	23	0	0	0	27	0	0	84	0	1	0
Lane Group Flow (vph)	32	261	0	611	726	426	84	474	148	484	568	0
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	5%	2%	2%	5%	2%
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	17.7		39.4	54.8	71.0	6.2	20.0	59.4	16.2	30.0	
Effective Green, g (s)	2.3	17.7		39.4	54.8	71.0	6.2	20.0	59.4	16.2	30.0	
Actuated g/C Ratio	0.02	0.16		0.36	0.50	0.65	0.06	0.18	0.54	0.15	0.27	
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)	37	551		638	887	1013	100	629	914	509	941	
v/s Ratio Prot	0.02	0.08		c0.35	c0.41	0.06	0.05	c0.14	0.06	c0.14	0.17	
v/s Ratio Perm						0.23			0.04			
v/c Ratio	0.86	0.47		0.96	0.82	0.42	0.84	0.75	0.16	0.95	0.60	
Uniform Delay, d1	53.3	41.6		34.1	23.0	9.2	51.1	42.3	12.5	46.2	34.5	
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	94.6	0.6		25.3	5.9	0.3	43.1	5.1	0.1	27.9	1.1	
Delay (s)	147.9	42.2		59.4	29.0	9.5	94.1	47.4	12.6	74.0	35.6	
Level of Service	F	D		E	C	A	F	D	B	E	D	
Approach Delay (s)		52.9			34.4			42.2			53.2	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM Average Control Delay	42.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	109.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	40	230	20	30	750	50	20	150	60	10	180	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	242	21	32	789	53	21	158	63	11	189	42

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	305	874	179	63	200	42
Volume Left (vph)	42	32	21	0	11	0
Volume Right (vph)	21	53	0	63	0	42
Hadj (s)	0.02	0.01	0.09	-0.67	0.06	-0.67
Departure Headway (s)	6.9	6.4	8.0	7.2	7.9	7.2
Degree Utilization, x	0.58	1.54	0.40	0.13	0.44	0.08
Capacity (veh/h)	504	572	425	474	435	476
Control Delay (s)	19.1	270.1	14.9	10.1	15.8	9.6
Approach Delay (s)	19.1	270.1	13.6		14.7	
Approach LOS	C	F	B		B	

Intersection Summary			
Delay	149.5		
HCM Level of Service	F		
Intersection Capacity Utilization	77.0%	ICU Level of Service	D
Analysis Period (min)	15		

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
Frpb, ped/bikes	1.00	1.00	0.98		1.00	0.98	1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	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	0.85	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	1736	1549		1807	1559	1770	3518		1770	1863	1541
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	1736	1549		1807	1559	1770	3518		1770	1863	1541
Volume (vph)	130	60	510	80	50	90	410	880	30	140	1170	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)	137	63	537	84	53	95	432	926	32	147	1232	126
RTOR Reduction (vph)	0	0	307	0	0	83	0	2	0	0	0	32
Lane Group Flow (vph)	98	102	230	0	137	12	432	956	0	147	1232	94
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
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)	7.0	7.0	7.0		13.8	13.8	19.0	61.6		13.5	56.1	56.1
Effective Green, g (s)	7.0	7.0	7.0		14.8	14.8	20.0	62.6		14.5	57.1	57.1
Actuated g/C Ratio	0.06	0.06	0.06		0.13	0.13	0.17	0.54		0.13	0.50	0.50
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)	102	106	94		233	201	308	1917		223	926	766
v/s Ratio Prot	0.06	0.06			c0.08		c0.24	0.27		0.08	c0.66	
v/s Ratio Perm			c0.15			0.01						0.06
v/c Ratio	0.96	0.96	2.45		0.59	0.06	1.40	0.50		0.66	1.33	0.12
Uniform Delay, d1	53.8	53.8	54.0		47.2	43.9	47.5	16.3		47.8	28.9	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	76.1	74.9	681.6		3.8	0.1	199.6	0.2		6.9	156.2	0.1
Delay (s)	130.0	128.7	735.6		50.9	44.1	247.1	16.5		54.7	185.1	15.6
Level of Service	F	F	F		D	D	F	B		D	F	B
Approach Delay (s)		571.0			48.1			88.2			158.1	
Approach LOS		F			D			F			F	

Intersection Summary			
HCM Average Control Delay	205.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.31		
Actuated Cycle Length (s)	114.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	111.0%	ICU Level of Service	H
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		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
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.98		1.00	0.97
Flpb, ped/bikes	1.00	1.00	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	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)	1770	3438	1559	1770	3428		3433	1863	1559		1832	1536
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)	1770	3438	1559	1770	3428		3433	1863	1559		1832	1536
Volume (vph)	50	1240	1100	290	950	20	750	60	290	20	40	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)	53	1305	1158	305	1000	21	789	63	305	21	42	42
RTOR Reduction (vph)	0	0	382	0	1	0	0	0	188	0	0	41
Lane Group Flow (vph)	53	1305	776	305	1020	0	789	63	117	0	63	1
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	2%	5%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
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	54.0	54.0	18.0	66.4		26.0	26.0	26.0		4.0	4.0
Effective Green, g (s)	6.6	55.0	55.0	19.0	67.4		27.0	27.0	27.0		4.0	4.0
Actuated g/C Ratio	0.05	0.45	0.45	0.16	0.56		0.22	0.22	0.22		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)	97	1563	709	278	1909		766	416	348		61	51
v/s Ratio Prot	0.03	0.38		c0.17	0.30		c0.23	0.03			c0.03	
v/s Ratio Perm			c0.50						0.08			0.00
v/c Ratio	0.55	0.83	1.09	1.10	0.53		1.03	0.15	0.34		1.03	0.03
Uniform Delay, d1	55.7	29.0	33.0	51.0	16.9		47.0	37.8	39.5		58.5	56.6
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	6.2	4.0	62.3	82.5	0.3		40.4	0.2	0.6		124.7	0.2
Delay (s)	61.9	33.0	95.3	133.5	17.2		87.4	38.0	40.0		183.2	56.8
Level of Service	E	C	F	F	B		F	D	D		F	E
Approach Delay (s)		62.3			43.9			72.3			132.7	
Approach LOS		E			D			E			F	

Intersection Summary			
HCM Average Control Delay	61.2	HCM Level of Service	E
HCM Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	121.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	98.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

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
Frpb, ped/bikes	1.00	1.00	1.00		1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00		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	3438	3416		1770	1561
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3438	3416		1770	1561
Volume (vph)	100	1430	1280	60	80	80
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	1505	1347	63	84	84
RTOR Reduction (vph)	0	0	3	0	0	73
Lane Group Flow (vph)	105	1505	1407	0	84	11
Confl. Peds. (#/hr)	2			2	2	2
Heavy Vehicles (%)	2%	5%	5%	2%	2%	2%
Turn Type	Prot					Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	4.2	51.4	43.2		9.4	9.4
Effective Green, g (s)	4.2	52.4	44.2		9.4	9.4
Actuated g/C Ratio	0.06	0.75	0.63		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)	107	2581	2163		238	210
v/s Ratio Prot	c0.06	0.44	c0.41		c0.05	
v/s Ratio Perm						0.01
v/c Ratio	0.98	0.58	0.65		0.35	0.05
Uniform Delay, d1	32.8	3.9	8.0		27.4	26.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	80.7	0.3	0.7		0.9	0.1
Delay (s)	113.5	4.2	8.7		28.3	26.4
Level of Service	F	A	A		C	C
Approach Delay (s)		11.3	8.7		27.4	
Approach LOS		B	A		C	

Intersection Summary			
HCM Average Control Delay	11.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	69.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	1460	50	10	1390	30	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1537	53	11	1463	32	11
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)	820			697		
pX, platoon unblocked			0.24		0.61	0.24
vC, conflicting volume			1591		3051	1567
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			3441		2498	3341
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			43		0	0
cM capacity (veh/h)			18		8	3

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	1589	11	1463	42
Volume Left	0	11	0	32
Volume Right	53	0	0	11
cSH	1700	18	1700	5
Volume to Capacity	0.93	0.57	0.86	7.81
Queue Length 95th (ft)	0	39	0	Err
Control Delay (s)	0.0	347.9	0.0	Err
Lane LOS		F		F
Approach Delay (s)	0.0	2.5		Err
Approach LOS				F

Intersection Summary			
Average Delay	136.8		
Intersection Capacity Utilization	90.5%	ICU Level of Service	E
Analysis Period (min)	15		

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	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00		1.00	0.98			0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.99	1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.89			0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1768	1810	1543	1770	1807		1759	1624			1668	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.74	1.00			0.90	
Satd. Flow (perm)	1768	1810	1543	1770	1807		1375	1624			1540	
Volume (vph)	10	1380	120	30	1170	10	210	10	30	10	0	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	1453	126	32	1232	11	221	11	32	11	0	11
RTOR Reduction (vph)	0	0	31	0	0	0	0	26	0	0	9	0
Lane Group Flow (vph)	11	1453	95	32	1243	0	221	17	0	0	13	0
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	2%	5%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
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	67.6	67.6	2.4	69.2		17.8	17.8			18.8	
Effective Green, g (s)	0.8	68.6	68.6	2.4	70.2		18.8	18.8			18.8	
Actuated g/C Ratio	0.01	0.67	0.67	0.02	0.69		0.18	0.18			0.18	
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)	14	1220	1040	42	1246		254	300			284	
v/s Ratio Prot	0.01	c0.80		c0.02	0.69			0.01				
v/s Ratio Perm			0.06				c0.16				0.01	
v/c Ratio	0.79	1.19	0.09	0.76	1.00		0.87	0.06			0.05	
Uniform Delay, d1	50.4	16.6	5.8	49.4	15.7		40.3	34.2			34.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	130.6	94.3	0.0	56.2	24.7		26.0	0.1			0.1	
Delay (s)	181.0	110.9	5.8	105.6	40.4		66.3	34.3			34.2	
Level of Service	F	F	A	F	D		E	C			C	
Approach Delay (s)		103.1			42.0			61.1			34.2	
Approach LOS		F			D			E			C	

Intersection Summary			
HCM Average Control Delay	74.4	HCM Level of Service	E
HCM Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	101.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	97.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	1350	20	0	1280	30	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1421	21	0	1347	32	11
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1444		2783	1436
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1444		2783	1436
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		0	94
cM capacity (veh/h)			469		21	163

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	1442	0	1347	42
Volume Left	0	0	0	32
Volume Right	21	0	0	11
cSH	1700	1700	1700	27
Volume to Capacity	0.85	0.00	0.79	1.59
Queue Length 95th (ft)	0	0	0	127
Control Delay (s)	0.0	0.0	0.0	610.0
Lane LOS				F
Approach Delay (s)	0.0	0.0		610.0
Approach LOS				F

Intersection Summary			
Average Delay	9.1		
Intersection Capacity Utilization	82.9%	ICU Level of Service	E
Analysis Period (min)	15		

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	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	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	0.98	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	3509		1770	1738	1479	1770	3438	1571	3433	3426	
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	3509		1770	1738	1479	1770	3438	1571	3433	3426	
Volume (vph)	100	770	40	320	440	660	140	520	590	500	840	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	811	42	337	463	695	147	547	621	526	884	21
RTOR Reduction (vph)	0	3	0	0	4	31	0	0	8	0	1	0
Lane Group Flow (vph)	105	850	0	337	511	612	147	547	613	526	904	0
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	5%	2%	2%	5%	2%
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	29.4		24.4	45.0	65.1	11.5	24.8	49.2	20.1	33.4	
Effective Green, g (s)	8.8	29.4		24.4	45.0	65.1	11.5	24.8	49.2	20.1	33.4	
Actuated g/C Ratio	0.08	0.26		0.21	0.39	0.57	0.10	0.22	0.43	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	
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)	136	899		377	682	891	177	743	729	602	998	
v/s Ratio Prot	0.06	c0.24		c0.19	0.29	0.12	0.08	0.16	c0.18	c0.15	c0.26	
v/s Ratio Perm						0.29			0.21			
v/c Ratio	0.77	0.95		0.89	0.75	0.69	0.83	0.74	0.84	0.87	0.91	
Uniform Delay, d1	52.0	41.9		43.9	30.0	17.6	50.6	41.9	29.3	46.1	39.1	
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	23.3	18.1		22.5	4.5	2.2	26.8	3.8	8.7	13.3	11.4	
Delay (s)	75.3	59.9		66.4	34.5	19.8	77.5	45.7	37.9	59.3	50.6	
Level of Service	E	E		E	C	B	E	D	D	E	D	
Approach Delay (s)		61.6			35.4			45.6			53.8	
Approach LOS		E			D			D			D	

Intersection Summary			
HCM Average Control Delay	47.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	114.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	87.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	40	850	40	80	510	10	30	230	60	30	150	10
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	895	42	84	537	11	32	242	63	32	158	11

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	979	632	274	63	189	11
Volume Left (vph)	42	84	32	0	32	0
Volume Right (vph)	42	11	0	63	0	11
Hadj (s)	0.02	0.05	0.09	-0.67	0.12	-0.67
Departure Headway (s)	7.4	7.5	8.7	7.9	9.1	8.3
Degree Utilization, x	2.03	1.31	0.66	0.14	0.48	0.02
Capacity (veh/h)	488	490	405	446	385	419
Control Delay (s)	486.2	177.6	25.7	11.0	19.0	10.3
Approach Delay (s)	486.2	177.6	22.9		18.6	
Approach LOS	F	F	C		C	

Intersection Summary			
Delay	279.2		
HCM Level of Service	F		
Intersection Capacity Utilization	92.8%	ICU Level of Service	F
Analysis Period (min)	15		

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
Frpb, ped/bikes	1.00	1.00	0.98		1.00	0.99	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	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	0.85	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	1553		1804	1560	1770	3520		1770	1863	1544
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	1553		1804	1560	1770	3520		1770	1863	1544
Volume (vph)	140	10	240	20	10	20	410	620	20	50	420	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)	147	11	253	21	11	21	432	653	21	53	442	189
RTOR Reduction (vph)	0	0	232	0	0	20	0	2	0	0	0	122
Lane Group Flow (vph)	77	81	21	0	32	1	432	672	0	53	442	67
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
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)	7.1	7.1	7.1		5.0	5.0	24.7	49.6		3.9	28.8	28.8
Effective Green, g (s)	7.1	7.1	7.1		6.0	6.0	25.7	50.6		4.9	29.8	29.8
Actuated g/C Ratio	0.08	0.08	0.08		0.07	0.07	0.30	0.60		0.06	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)	141	142	130		128	111	538	2105		103	656	544
v/s Ratio Prot	0.05	c0.05			c0.02		c0.24	0.19		0.03	c0.24	
v/s Ratio Perm			0.01			0.00						0.04
v/c Ratio	0.55	0.57	0.16		0.25	0.01	0.80	0.32		0.51	0.67	0.12
Uniform Delay, d1	37.2	37.3	36.0		37.2	36.5	27.1	8.4		38.7	23.3	18.5
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	4.3	5.4	0.6		1.0	0.0	8.5	0.1		4.3	2.7	0.1
Delay (s)	41.5	42.7	36.6		38.2	36.6	35.6	8.5		43.0	26.0	18.6
Level of Service	D	D	D		D	D	D	A		D	C	B
Approach Delay (s)		38.7			37.6			19.1			25.3	
Approach LOS		D			D			B			C	

Intersection Summary			
HCM Average Control Delay	25.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	84.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	65.8%	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		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
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00	0.99		1.00	0.98
Flpb, ped/bikes	1.00	1.00	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	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)	1770	3438	1560	1770	3430		3433	1863	1560		1837	1547
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)	1770	3438	1560	1770	3430		3433	1863	1560		1837	1547
Volume (vph)	20	850	280	320	1250	20	550	30	200	20	50	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	895	295	337	1316	21	579	32	211	21	53	63
RTOR Reduction (vph)	0	0	194	0	1	0	0	0	165	0	0	60
Lane Group Flow (vph)	21	895	101	337	1336	0	579	32	46	0	74	3
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	2%	5%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
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)	1.3	34.7	34.7	22.8	56.2		21.7	21.7	21.7		5.7	5.7
Effective Green, g (s)	2.3	35.7	35.7	23.8	57.2		22.7	22.7	22.7		5.7	5.7
Actuated g/C Ratio	0.02	0.34	0.34	0.23	0.55		0.22	0.22	0.22		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)	39	1181	536	405	1888		750	407	341		101	85
v/s Ratio Prot	0.01	c0.26		c0.19	0.39		c0.17	0.02			c0.04	
v/s Ratio Perm			0.06						0.03			0.00
v/c Ratio	0.54	0.76	0.19	0.83	0.71		0.77	0.08	0.14		0.73	0.04
Uniform Delay, d1	50.3	30.3	23.9	38.1	17.2		38.2	32.3	32.7		48.3	46.5
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	13.5	2.8	0.2	13.6	1.2		4.9	0.1	0.2		23.7	0.2
Delay (s)	63.8	33.1	24.1	51.7	18.4		43.1	32.4	32.9		72.1	46.7
Level of Service	E	C	C	D	B		D	C	C		E	D
Approach Delay (s)		31.4			25.1			40.1			60.4	
Approach LOS		C			C			D			E	

Intersection Summary			
HCM Average Control Delay	31.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	103.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	140	540	10	20	280	40	10	0	10	40	10	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)	147	568	11	21	295	42	11	0	11	42	11	21

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	726	358	21	74
Volume Left (vph)	147	21	11	42
Volume Right (vph)	11	42	11	21
Hadj (s)	0.03	-0.06	-0.17	-0.05
Departure Headway (s)	4.7	5.0	6.5	6.4
Degree Utilization, x	0.95	0.50	0.04	0.13
Capacity (veh/h)	755	706	519	530
Control Delay (s)	42.5	12.9	9.7	10.4
Approach Delay (s)	42.5	12.9	9.7	10.4
Approach LOS	E	B	A	B

Intersection Summary			
Delay	30.9		
HCM Level of Service	D		
Intersection Capacity Utilization	74.7%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	60	460	10	10	270	20	40	30	10	40	50	80
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)	63	484	11	11	284	21	42	32	11	42	53	84

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	558	316	84	179
Volume Left (vph)	63	11	42	42
Volume Right (vph)	11	21	11	84
Hadj (s)	0.01	-0.03	0.03	-0.24
Departure Headway (s)	5.3	5.6	6.7	6.2
Degree Utilization, x	0.82	0.49	0.16	0.31
Capacity (veh/h)	663	597	467	526
Control Delay (s)	27.7	13.9	11.0	11.9
Approach Delay (s)	27.7	13.9	11.0	11.9
Approach LOS	D	B	B	B

Intersection Summary			
Delay	20.2		
HCM Level of Service	C		
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	1030	30	10	1690	60	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1084	32	11	1779	63	11
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1118		1999	546
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1118		1999	546
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		0	98
cM capacity (veh/h)			620		51	480

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1
Volume Total	542	542	32	11	889	889	74
Volume Left	0	0	0	11	0	0	63
Volume Right	0	0	32	0	0	0	11
cSH	1700	1700	1700	620	1700	1700	59
Volume to Capacity	0.32	0.32	0.02	0.02	0.52	0.52	1.26
Queue Length 95th (ft)	0	0	0	1	0	0	157
Control Delay (s)	0.0	0.0	0.0	10.9	0.0	0.0	319.1
Lane LOS				B			F
Approach Delay (s)	0.0			0.1			319.1
Approach LOS							F

Intersection Summary			
Average Delay	7.9		
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		

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
Lane Width	12	12	14	12	12	12	12	12	12	12	12	14
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	
Frpb, ped/bikes	1.00	0.99		1.00	0.99	0.99	1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	0.95	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	3386		1770	1671	1494	1770	3438	1572	3433	3429	
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	3386		1770	1671	1494	1770	3438	1572	3433	3429	
Volume (vph)	50	220	70	380	310	1080	100	560	210	470	550	10
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	50	220	70	380	310	1080	100	560	210	470	550	10
RTOR Reduction (vph)	0	25	0	0	15	21	0	0	100	0	1	0
Lane Group Flow (vph)	50	265	0	380	454	900	100	560	110	470	559	0
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	5%	2%	2%	5%	2%
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)	4.0	11.8		26.0	33.8	76.8	11.1	24.0	50.0	43.0	55.9	
Effective Green, g (s)	4.0	11.8		26.0	33.8	76.8	11.1	24.0	50.0	43.0	55.9	
Actuated g/C Ratio	0.03	0.10		0.22	0.28	0.64	0.09	0.20	0.41	0.36	0.46	
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)	59	331		381	468	999	163	683	651	1222	1587	
v/s Ratio Prot	0.03	c0.08		0.21	c0.27	c0.32	0.06	c0.16	0.04	0.14	0.16	
v/s Ratio Perm						0.28			0.03			
v/c Ratio	0.85	0.80		1.00	0.97	0.90	0.61	0.82	0.17	0.38	0.35	
Uniform Delay, d1	58.1	53.3		47.4	43.0	18.7	52.8	46.3	22.3	29.0	20.8	
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	64.8	12.7		45.1	33.4	11.0	6.7	10.6	0.1	0.2	0.6	
Delay (s)	122.9	66.0		92.5	76.4	29.7	59.5	56.9	22.4	29.2	21.4	
Level of Service	F	E		F	E	C	E	E	C	C	C	
Approach Delay (s)		74.4			55.6			48.9			25.0	
Approach LOS		E			E			D			C	

Intersection Summary			
HCM Average Control Delay	47.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	120.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	86.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	260	20	50	360	10	20	240	70	10	210	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)	11	274	21	53	379	11	21	253	74	11	221	32

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	305	442	274	74	232	32
Volume Left (vph)	11	53	21	0	11	0
Volume Right (vph)	21	11	0	74	0	32
Hadj (s)	0.00	0.04	0.07	-0.67	0.06	-0.67
Departure Headway (s)	7.4	7.0	8.1	7.3	8.3	7.5
Degree Utilization, x	0.63	0.86	0.62	0.15	0.53	0.07
Capacity (veh/h)	447	442	414	452	410	446
Control Delay (s)	22.0	40.0	22.1	10.4	19.2	9.9
Approach Delay (s)	22.0	40.0	19.6		18.0	
Approach LOS	C	E	C		C	

Intersection Summary			
Delay	26.5		
HCM Level of Service	D		
Intersection Capacity Utilization	76.6%	ICU Level of Service	D
Analysis Period (min)	15		

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	1.00	0.95		1.00	1.00			1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	0.98			1.00	
Flpb, ped/bikes	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			0.99	
Satd. Flow (prot)	1770	3438	1578	1805	3435		1801	1578			1718	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.73	1.00			0.96	
Satd. Flow (perm)	1770	3438	1578	1805	3435		1382	1578			1664	
Volume (vph)	10	430	600	10	1490	10	300	0	10	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	453	632	11	1568	11	316	0	11	11	11	21
RTOR Reduction (vph)	0	0	481	0	0	0	0	8	0	0	15	0
Lane Group Flow (vph)	11	453	151	11	1579	0	316	3	0	0	28	0
Confl. Peds. (#/hr)			2	10			2		10			
Heavy Vehicles (%)	2%	5%	0%	0%	5%	2%	0%	2%	0%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Perm			Perm		
Protected Phases	5	1		2	6			8			4	
Permitted Phases		1	1				8			4		
Actuated Green, G (s)	0.6	16.4	16.4	20.8	36.6		19.4	19.4			19.4	
Effective Green, g (s)	0.6	16.4	16.4	20.8	36.6		19.4	19.4			19.4	
Actuated g/C Ratio	0.01	0.24	0.24	0.30	0.53		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)	15	822	377	547	1833		391	446			471	
v/s Ratio Prot	0.01	c0.13		0.01	c0.46			0.00				
v/s Ratio Perm			0.10				c0.23				0.02	
v/c Ratio	0.73	0.55	0.40	0.02	0.86		0.81	0.01			0.06	
Uniform Delay, d1	33.9	22.9	22.0	16.8	13.8		22.9	17.7			17.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	103.2	0.8	0.7	0.0	4.4		11.6	0.0			0.1	
Delay (s)	137.2	23.7	22.7	16.8	18.2		34.5	17.7			18.0	
Level of Service	F	C	C	B	B		C	B			B	
Approach Delay (s)		24.2			18.2			33.9			18.0	
Approach LOS		C			B			C			B	

Intersection Summary			
HCM Average Control Delay	22.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	68.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.5%	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	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.92		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	3386		1770	3402		1748	1687		1770	1701	
Flt Permitted	0.95	1.00		0.95	1.00		0.70	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3386		1770	3402		1293	1687		1770	1701	
Volume (vph)	40	390	40	20	1470	100	10	50	60	90	40	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	411	42	21	1547	105	11	53	63	95	42	42
RTOR Reduction (vph)	0	6	0	0	4	0	0	57	0	0	33	0
Lane Group Flow (vph)	42	447	0	21	1648	0	11	59	0	95	51	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Heavy Vehicles (%)	2%	5%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot			Prot			Perm			Prot		
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases							2					
Actuated Green, G (s)	2.4	50.5		2.0	50.1		8.4	8.4		5.2	17.6	
Effective Green, g (s)	2.4	50.5		2.0	50.1		8.4	8.4		5.2	17.6	
Actuated g/C Ratio	0.03	0.62		0.02	0.61		0.10	0.10		0.06	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)	52	2083		43	2076		132	173		112	365	
v/s Ratio Prot	c0.02	0.13		0.01	c0.48			c0.04		c0.05	0.03	
v/s Ratio Perm							0.01					
v/c Ratio	0.81	0.21		0.49	0.79		0.08	0.34		0.85	0.14	
Uniform Delay, d1	39.6	7.0		39.5	12.1		33.4	34.3		38.1	26.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	58.8	0.1		8.5	2.2		0.3	1.2		41.5	0.2	
Delay (s)	98.5	7.1		48.0	14.3		33.6	35.5		79.6	26.3	
Level of Service	F	A		D	B		C	D		E	C	
Approach Delay (s)		14.8			14.7			35.3			54.6	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM Average Control Delay	18.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	82.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	63.2%	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	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00			0.98			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	1.00			0.90			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1770	3363		1770	3435			1638			1750	
Flt Permitted	0.95	1.00		0.95	1.00			0.96			0.89	
Satd. Flow (perm)	1770	3363		1770	3435			1586			1591	
Volume (vph)	10	460	70	100	1570	10	10	10	60	10	10	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	484	74	105	1653	11	11	11	63	11	11	11
RTOR Reduction (vph)	0	15	0	0	0	0	0	53	0	0	9	0
Lane Group Flow (vph)	11	543	0	105	1664	0	0	32	0	0	24	0
Confl. Peds. (#/hr)			10	10			10		10			
Heavy Vehicles (%)	2%	5%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	0.5	27.8		4.5	31.8			8.1			8.1	
Effective Green, g (s)	0.5	27.8		4.5	31.8			8.1			8.1	
Actuated g/C Ratio	0.01	0.53		0.09	0.61			0.15			0.15	
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)	17	1784		152	2085			245			246	
v/s Ratio Prot	0.01	0.16		c0.06	c0.48							
v/s Ratio Perm								c0.02			0.01	
v/c Ratio	0.65	0.30		0.69	0.80			0.13			0.10	
Uniform Delay, d1	25.9	6.9		23.3	7.9			19.1			19.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	62.0	0.1		12.7	2.2			0.2			0.2	
Delay (s)	87.9	7.0		36.0	10.1			19.3			19.2	
Level of Service	F	A		D	B			B			B	
Approach Delay (s)		8.5			11.6			19.3			19.2	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM Average Control Delay	11.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	52.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	430	80	170	50	100	140
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	453	84	179	53	105	147

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	453	84	179	53	105	147
Volume Left (vph)	453	0	179	0	0	0
Volume Right (vph)	0	84	0	0	0	147
Hadj (s)	0.50	-0.70	0.50	0.00	0.00	-0.70
Departure Headway (s)	6.4	5.2	7.1	6.6	6.6	5.9
Degree Utilization, x	0.81	0.12	0.35	0.10	0.19	0.24
Capacity (veh/h)	552	663	470	508	506	567
Control Delay (s)	29.6	7.7	12.8	9.1	10.0	9.6
Approach Delay (s)	26.2		12.0		9.8	
Approach LOS	D		B		A	

Intersection Summary			
Delay	18.9		
HCM Level of Service	C		
Intersection Capacity Utilization	46.6%	ICU Level of Service	A
Analysis Period (min)	15		

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	0.95	1.00	1.00	0.95	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	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)	3438	1583	1770	3438	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3438	1583	1770	3438	1770	1583
Volume (vph)	490	40	200	1620	20	460
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	516	42	211	1705	21	484
RTOR Reduction (vph)	0	25	0	0	0	398
Lane Group Flow (vph)	516	17	211	1705	21	86
Confl. Peds. (#/hr)						
Heavy Vehicles (%)	5%	2%	2%	5%	2%	2%
Turn Type		Perm	Prot			Perm
Protected Phases	4		3	8	2	
Permitted Phases		4				2
Actuated Green, G (s)	20.4	20.4	9.3	33.7	9.0	9.0
Effective Green, g (s)	20.4	20.4	9.3	33.7	9.0	9.0
Actuated g/C Ratio	0.40	0.40	0.18	0.66	0.18	0.18
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)	1383	637	325	2285	314	281
v/s Ratio Prot	0.15		0.12	c0.50	0.01	
v/s Ratio Perm		0.01				c0.05
v/c Ratio	0.37	0.03	0.65	0.75	0.07	0.31
Uniform Delay, d1	10.7	9.2	19.2	5.7	17.4	18.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.0	4.4	1.4	0.1	0.6
Delay (s)	10.8	9.2	23.6	7.0	17.4	18.8
Level of Service	B	A	C	A	B	B
Approach Delay (s)	10.7			8.8	18.7	
Approach LOS	B			A	B	

Intersection Summary			
HCM Average Control Delay	10.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	50.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.8%	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		0.95		1.00	1.00	0.88	1.00	1.00		0.97	1.00	
Frpb, ped/bikes		0.99		1.00	1.00	1.00	1.00	0.99		1.00	0.97	
Flpb, ped/bikes		1.00		0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.98		1.00	1.00	0.85	1.00	0.94		1.00	0.93	
Flt Protected		1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3423		1745	1863	2787	1770	1726		3433	1664	
Flt Permitted		0.95		0.28	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		3253		506	1863	2787	1770	1726		3433	1664	
Volume (vph)	10	420	80	80	120	1600	120	60	40	490	20	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	442	84	84	126	1684	126	63	42	516	21	21
RTOR Reduction (vph)	0	18	0	0	0	757	0	30	0	0	11	0
Lane Group Flow (vph)	0	519	0	84	126	927	126	75	0	516	31	0
Confl. Peds. (#/hr)	20		20	20			20		20			20
Turn Type	Perm			Perm		Over	Split			Split		
Protected Phases		4			8	6	2	2		6	6	
Permitted Phases	4			8								
Actuated Green, G (s)		17.2		17.2	17.2	36.2	9.4	9.4		36.2	36.2	
Effective Green, g (s)		17.2		17.2	17.2	36.2	9.4	9.4		36.2	36.2	
Actuated g/C Ratio		0.23		0.23	0.23	0.48	0.13	0.13		0.48	0.48	
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)		748		116	428	1349	222	217		1661	805	
v/s Ratio Prot					0.07	c0.33	c0.07	0.04		0.15	0.02	
v/s Ratio Perm		0.16		c0.17								
v/c Ratio		0.69		0.72	0.29	0.69	0.57	0.35		0.31	0.04	
Uniform Delay, d1		26.4		26.6	23.8	14.9	30.8	29.9		11.7	10.1	
Progression Factor		1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.8		19.9	0.4	2.9	3.3	1.0		0.5	0.1	
Delay (s)		29.2		46.5	24.2	17.8	34.1	30.9		12.2	10.2	
Level of Service		C		D	C	B	C	C		B	B	
Approach Delay (s)		29.2			19.5			32.6			12.1	
Approach LOS		C			B			C			B	

Intersection Summary			
HCM Average Control Delay	20.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	74.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	93.4%	ICU Level of Service	F
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	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
Frpb, ped/bikes	1.00	1.00	0.98		1.00	0.98	1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	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	0.85	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	1711	1556		1807	1559	1770	3517		1770	1863	1541
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	1711	1556		1807	1559	1770	3517		1770	1863	1541
Volume (vph)	310	60	410	80	50	80	390	810	30	150	730	160
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)	326	63	432	84	53	84	411	853	32	158	768	168
RTOR Reduction (vph)	0	0	379	0	0	73	0	2	0	0	0	70
Lane Group Flow (vph)	189	200	53	0	137	11	411	883	0	158	768	98
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
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		13.8	13.8	25.0	54.8		14.3	44.1	44.1
Effective Green, g (s)	13.0	13.0	13.0		14.8	14.8	26.0	55.8		15.3	45.1	45.1
Actuated g/C Ratio	0.11	0.11	0.11		0.13	0.13	0.23	0.49		0.13	0.39	0.39
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)	190	194	176		233	201	401	1708		236	731	605
v/s Ratio Prot	0.11	c0.12			c0.08		c0.23	0.25		0.09	c0.41	
v/s Ratio Perm			0.03			0.01						0.06
v/c Ratio	0.99	1.03	0.30		0.59	0.05	1.02	0.52		0.67	1.05	0.16
Uniform Delay, d1	50.9	51.0	46.8		47.2	43.9	44.5	20.3		47.4	34.9	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	63.4	72.9	1.0		3.8	0.1	51.5	0.3		7.0	47.4	0.1
Delay (s)	114.3	123.9	47.8		50.9	44.0	95.9	20.6		54.4	82.3	22.8
Level of Service	F	F	D		D	D	F	C		D	F	C
Approach Delay (s)		81.6			48.3			44.5			69.1	
Approach LOS		F			D			D			E	

Intersection Summary			
HCM Average Control Delay	61.5	HCM Level of Service	E
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	114.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	86.9%	ICU Level of Service	E
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		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
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.98		1.00	0.97
Flpb, ped/bikes	1.00	1.00	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	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)	1770	3438	1559	1770	3426		3433	1863	1559		1811	1536
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)	1770	3438	1559	1770	3426		3433	1863	1559		1811	1536
Volume (vph)	40	1690	610	400	1220	30	650	60	490	40	30	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	1779	642	421	1284	32	684	63	516	42	32	32
RTOR Reduction (vph)	0	0	224	0	1	0	0	0	214	0	0	31
Lane Group Flow (vph)	42	1779	418	421	1315	0	684	63	302	0	74	1
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	2%	5%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
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)	6.6	52.0	52.0	22.0	67.4		24.0	24.0	24.0		4.0	4.0
Effective Green, g (s)	7.6	53.0	53.0	23.0	68.4		25.0	25.0	25.0		4.0	4.0
Actuated g/C Ratio	0.06	0.44	0.44	0.19	0.57		0.21	0.21	0.21		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)	111	1506	683	336	1937		709	385	322		60	51
v/s Ratio Prot	0.02	c0.52		c0.24	0.38		c0.20	0.03			c0.04	
v/s Ratio Perm			0.27						0.19			0.00
v/c Ratio	0.38	1.18	0.61	1.25	0.68		0.96	0.16	0.94		1.23	0.02
Uniform Delay, d1	54.4	34.0	26.1	49.0	18.6		47.6	39.4	47.2		58.5	56.6
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	2.2	88.7	1.6	136.0	1.0		25.2	0.2	33.8		191.8	0.2
Delay (s)	56.6	122.7	27.7	185.0	19.5		72.7	39.6	81.0		250.3	56.8
Level of Service	E	F	C	F	B		E	D	F		F	E
Approach Delay (s)		96.8			59.6			74.4			191.9	
Approach LOS		F			E			E			F	

Intersection Summary			
HCM Average Control Delay	82.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	121.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	104.1%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	30	510	10	10	280	80	20	20	10	80	10	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	537	11	11	295	84	21	21	11	84	11	21

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	579	389	53	116
Volume Left (vph)	32	11	21	84
Volume Right (vph)	11	84	11	21
Hadj (s)	0.00	-0.12	-0.01	0.04
Departure Headway (s)	5.0	5.1	6.6	6.4
Degree Utilization, x	0.81	0.56	0.10	0.21
Capacity (veh/h)	703	675	473	502
Control Delay (s)	25.4	14.3	10.3	11.1
Approach Delay (s)	25.4	14.3	10.3	11.1
Approach LOS	D	B	B	B

Intersection Summary			
Delay	19.4		
HCM Level of Service	C		
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	540	40	10	250	80	30	80	10	80	20	60
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)	11	568	42	11	263	84	32	84	11	84	21	63

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	621	358	126	168
Volume Left (vph)	11	11	32	84
Volume Right (vph)	42	84	11	63
Hadj (s)	-0.04	-0.14	0.00	-0.12
Departure Headway (s)	5.6	5.9	7.2	6.9
Degree Utilization, x	0.96	0.59	0.25	0.32
Capacity (veh/h)	638	585	459	491
Control Delay (s)	50.6	17.1	12.6	13.2
Approach Delay (s)	50.6	17.1	12.6	13.2
Approach LOS	F	C	B	B

Intersection Summary			
Delay	32.5		
HCM Level of Service	D		
Intersection Capacity Utilization	58.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	2070	70	10	1580	80	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	2179	74	11	1663	84	11
Pedestrians	2			2	2	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type					Raised	
Median storage veh)					1	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			2255		3036	1093
vC1, stage 1 conf vol					2181	
vC2, stage 2 conf vol					855	
vCu, unblocked vol			2255		3036	1093
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			95		0	95
cM capacity (veh/h)			224		57	208

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1
Volume Total	1089	1089	74	11	832	832	95
Volume Left	0	0	0	11	0	0	84
Volume Right	0	0	74	0	0	0	11
cSH	1700	1700	1700	224	1700	1700	62
Volume to Capacity	0.64	0.64	0.04	0.05	0.49	0.49	1.53
Queue Length 95th (ft)	0	0	0	4	0	0	209
Control Delay (s)	0.0	0.0	0.0	21.8	0.0	0.0	415.0
Lane LOS				C			F
Approach Delay (s)	0.0			0.1			415.0
Approach LOS							F

Intersection Summary			
Average Delay	9.8		
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		

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
Lane Width	12	12	14	12	12	12	12	12	12	12	12	14
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	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		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	3433		1770	1770	1494	1770	3438	1570	3433	3424	
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	3433		1770	1770	1494	1770	3438	1570	3433	3424	
Volume (vph)	110	480	100	290	450	830	160	640	420	1000	1040	30
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	110	480	100	290	450	830	160	640	420	1000	1040	30
RTOR Reduction (vph)	0	15	0	0	0	17	0	0	13	0	2	0
Lane Group Flow (vph)	110	565	0	290	450	813	160	640	407	1000	1068	0
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	5%	2%	2%	5%	2%
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)	9.0	21.6		20.0	32.6	70.6	13.3	24.0	44.0	38.0	48.7	
Effective Green, g (s)	9.0	21.6		20.0	32.6	70.6	13.3	24.0	44.0	38.0	48.7	
Actuated g/C Ratio	0.08	0.18		0.17	0.27	0.59	0.11	0.20	0.37	0.32	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)	133	620		296	482	932	197	690	578	1091	1394	
v/s Ratio Prot	0.06	c0.16		0.16	c0.25	c0.28	0.09	c0.19	0.12	c0.29	0.31	
v/s Ratio Perm						0.27			0.14			
v/c Ratio	0.83	0.91		0.98	0.93	0.87	0.81	0.93	0.70	0.92	0.77	
Uniform Delay, d1	54.5	48.1		49.6	42.4	20.7	51.9	46.9	32.3	39.3	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	32.5	17.7		46.2	25.3	9.0	21.9	20.5	3.9	11.8	4.1	
Delay (s)	87.0	65.8		95.8	67.7	29.7	73.8	67.4	36.2	51.1	34.6	
Level of Service	F	E		F	E	C	E	E	D	D	C	
Approach Delay (s)		69.2			52.8			57.5			42.6	
Approach LOS		E			D			E			D	

Intersection Summary			
HCM Average Control Delay	52.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	119.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	106.3%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	60	590	30	100	530	10	30	280	80	20	300	10
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)	63	621	32	105	558	11	32	295	84	21	316	11

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	716	674	326	84	337	11
Volume Left (vph)	63	105	32	0	21	0
Volume Right (vph)	32	11	0	84	0	11
Hadj (s)	0.03	0.06	0.08	-0.67	0.07	-0.67
Departure Headway (s)	8.8	8.8	9.4	8.7	9.4	8.7
Degree Utilization, x	1.75	1.66	0.86	0.20	0.88	0.03
Capacity (veh/h)	413	411	367	407	377	406
Control Delay (s)	369.8	327.5	47.3	12.7	51.4	10.7
Approach Delay (s)	369.8	327.5	40.2		50.1	
Approach LOS	F	F	E		F	

Intersection Summary			
Delay	241.8		
HCM Level of Service	F		
Intersection Capacity Utilization	97.9%	ICU Level of Service	F
Analysis Period (min)	15		

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	1.00	0.95		1.00	1.00			1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	0.99			1.00	
Flpb, ped/bikes	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	0.93			0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1770	3438	1576	1805	3426		1800	1716			1695	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.66	1.00			0.90	
Satd. Flow (perm)	1770	3438	1576	1805	3426		1257	1716			1558	
Volume (vph)	60	1660	520	10	1320	40	300	10	10	40	10	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)	63	1747	547	11	1389	42	316	11	11	42	11	63
RTOR Reduction (vph)	0	0	234	0	2	0	0	8	0	0	43	0
Lane Group Flow (vph)	63	1747	313	11	1429	0	316	14	0	0	73	0
Confl. Peds. (#/hr)			2	10			2		10			
Heavy Vehicles (%)	2%	5%	0%	0%	5%	2%	0%	2%	0%	2%	2%	2%
Turn Type	Prot		Perm	Prot			Perm			Perm		
Protected Phases	5	1		2	6			8			4	
Permitted Phases		1	1				8			4		
Actuated Green, G (s)	4.7	52.0	52.0	7.1	54.4		26.3	26.3			26.3	
Effective Green, g (s)	4.7	52.0	52.0	7.1	54.4		26.3	26.3			26.3	
Actuated g/C Ratio	0.05	0.53	0.53	0.07	0.56		0.27	0.27			0.27	
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)	85	1835	841	132	1913		339	463			421	
v/s Ratio Prot	0.04	c0.51		0.01	c0.42			0.01				
v/s Ratio Perm			0.20				c0.25				0.05	
v/c Ratio	0.74	0.95	0.37	0.08	0.75		0.93	0.03			0.17	
Uniform Delay, d1	45.7	21.5	13.2	42.1	16.3		34.7	26.2			27.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	28.9	11.6	0.3	0.3	1.6		31.8	0.0			0.2	
Delay (s)	74.7	33.2	13.5	42.4	17.9		66.4	26.2			27.4	
Level of Service	E	C	B	D	B		E	C			C	
Approach Delay (s)		29.7			18.1			63.8			27.4	
Approach LOS		C			B			E			C	

Intersection Summary			
HCM Average Control Delay	28.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	97.4	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			

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	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.98		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	3434		1770	3409		1748	1825		1770	1780	
Flt Permitted	0.95	1.00		0.95	1.00		0.68	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3434		1770	3409		1243	1825		1770	1780	
Volume (vph)	110	1590	10	20	1330	70	10	80	10	170	90	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)	116	1674	11	21	1400	74	11	84	11	179	95	32
RTOR Reduction (vph)	0	0	0	0	3	0	0	5	0	0	15	0
Lane Group Flow (vph)	116	1685	0	21	1471	0	11	90	0	179	112	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Heavy Vehicles (%)	2%	5%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot			Prot			Perm			Prot		
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases							2					
Actuated Green, G (s)	7.1	51.3		1.5	45.7		8.9	8.9		10.1	23.0	
Effective Green, g (s)	7.1	51.3		1.5	45.7		8.9	8.9		10.1	23.0	
Actuated g/C Ratio	0.08	0.58		0.02	0.52		0.10	0.10		0.12	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)	143	2006		30	1774		126	185		204	466	
v/s Ratio Prot	c0.07	c0.49		0.01	0.43			c0.05		c0.10	0.06	
v/s Ratio Perm							0.01					
v/c Ratio	0.81	0.84		0.70	0.83		0.09	0.48		0.88	0.24	
Uniform Delay, d1	39.7	14.9		42.9	17.8		35.8	37.3		38.2	25.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	28.2	3.3		52.7	3.4		0.3	2.0		31.8	0.3	
Delay (s)	67.9	18.2		95.7	21.1		36.1	39.3		70.0	25.8	
Level of Service	E	B		F	C		D	D		E	C	
Approach Delay (s)		21.4			22.2			38.9			51.6	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM Average Control Delay	24.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	87.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
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	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Frt	1.00	0.99		1.00	1.00			0.99			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.96			0.98	
Satd. Flow (prot)	1770	3403		1770	3432			1754			1729	
Flt Permitted	0.95	1.00		0.95	1.00			0.77			0.89	
Satd. Flow (perm)	1770	3403		1770	3432			1407			1570	
Volume (vph)	30	1670	100	110	1270	20	170	10	10	20	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)	32	1758	105	116	1337	21	179	11	11	21	11	21
RTOR Reduction (vph)	0	4	0	0	1	0	0	2	0	0	17	0
Lane Group Flow (vph)	32	1859	0	116	1357	0	0	199	0	0	36	0
Confl. Peds. (#/hr)			10	10			10		10			
Heavy Vehicles (%)	2%	5%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	3.2	54.0		4.1	54.9			17.3			17.3	
Effective Green, g (s)	3.2	54.0		4.1	54.9			17.3			17.3	
Actuated g/C Ratio	0.04	0.62		0.05	0.63			0.20			0.20	
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)	65	2103		83	2156			279			311	
v/s Ratio Prot	0.02	c0.55		c0.07	0.40							
v/s Ratio Perm								c0.14			0.02	
v/c Ratio	0.49	0.88		1.40	0.63			0.71			0.12	
Uniform Delay, d1	41.3	14.1		41.7	10.0			32.7			28.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	5.8	4.8		236.6	0.6			8.3			0.2	
Delay (s)	47.1	18.9		278.2	10.6			41.0			28.9	
Level of Service	D	B		F	B			D			C	
Approach Delay (s)		19.4			31.6			41.0			28.9	
Approach LOS		B			C			D			C	

Intersection Summary			
HCM Average Control Delay	25.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	87.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	470	200	190	50	100	240
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	495	211	200	53	105	253

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	495	211	200	53	105	253
Volume Left (vph)	495	0	200	0	0	0
Volume Right (vph)	0	211	0	0	0	253
Hadj (s)	0.50	-0.70	0.50	0.00	0.00	-0.70
Departure Headway (s)	6.8	5.6	7.7	7.2	7.1	6.4
Degree Utilization, x	0.94	0.33	0.43	0.11	0.21	0.45
Capacity (veh/h)	516	623	459	487	495	552
Control Delay (s)	50.1	10.2	15.3	9.9	10.8	13.4
Approach Delay (s)	38.2		14.2		12.6	
Approach LOS	E		B		B	

Intersection Summary			
Delay	26.6		
HCM Level of Service	D		
Intersection Capacity Utilization	49.9%	ICU Level of Service	A
Analysis Period (min)	15		

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	0.95	1.00	1.00	0.95	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	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)	3438	1583	1770	3438	1770	1583
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3438	1583	1770	3438	1770	1583
Volume (vph)	1630	50	290	1370	30	490
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1716	53	305	1442	32	516
RTOR Reduction (vph)	0	22	0	0	0	299
Lane Group Flow (vph)	1716	31	305	1442	32	217
Confl. Peds. (#/hr)						
Heavy Vehicles (%)	5%	2%	2%	5%	2%	2%
Turn Type		Perm	Prot			Perm
Protected Phases	4		3	8	2	
Permitted Phases		4				2
Actuated Green, G (s)	49.2	49.2	20.0	73.2	15.0	15.0
Effective Green, g (s)	49.2	49.2	20.0	73.2	15.0	15.0
Actuated g/C Ratio	0.51	0.51	0.21	0.76	0.16	0.16
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)	1758	810	368	2616	276	247
v/s Ratio Prot	c0.50		c0.17	0.42	0.02	
v/s Ratio Perm		0.02				c0.14
v/c Ratio	0.98	0.04	0.83	0.55	0.12	0.88
Uniform Delay, d1	22.9	11.7	36.5	4.7	34.9	39.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	16.0	0.0	14.2	0.3	0.2	27.8
Delay (s)	38.9	11.7	50.7	5.0	35.1	67.5
Level of Service	D	B	D	A	D	E
Approach Delay (s)	38.1			13.0	65.6	
Approach LOS	D			B	E	

Intersection Summary			
HCM Average Control Delay	31.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	96.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.1%	ICU Level of Service	E
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		0.95		1.00	1.00	0.88	1.00	1.00		0.97	1.00	
Frpb, ped/bikes		0.98		1.00	1.00	1.00	1.00	0.99		1.00	0.98	
Flpb, ped/bikes		1.00		0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.96		1.00	1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected		1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3315		1751	1863	2787	1770	1786		3433	1774	
Flt Permitted		0.95		0.19	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		3149		341	1863	2787	1770	1786		3433	1774	
Volume (vph)	10	460	200	60	230	1370	100	110	30	1630	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)	11	484	211	63	242	1442	105	116	32	1716	42	11
RTOR Reduction (vph)	0	46	0	0	0	631	0	10	0	0	5	0
Lane Group Flow (vph)	0	660	0	63	242	811	105	138	0	1716	48	0
Confl. Peds. (#/hr)	20		20	20			20		20			20
Turn Type	Perm			Perm		Over	Split			Split		
Protected Phases		4			8	6	2	2		6	6	
Permitted Phases	4			8								
Actuated Green, G (s)		21.6		21.6	21.6	47.1	12.5	12.5		47.1	47.1	
Effective Green, g (s)		21.6		21.6	21.6	47.1	12.5	12.5		47.1	47.1	
Actuated g/C Ratio		0.23		0.23	0.23	0.51	0.13	0.13		0.51	0.51	
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)		730		79	432	1408	237	240		1735	897	
v/s Ratio Prot					0.13	0.29	0.06	c0.08		c0.50	0.03	
v/s Ratio Perm		c0.21		0.18								
v/c Ratio		0.90		0.80	0.56	0.58	0.44	0.57		0.99	0.05	
Uniform Delay, d1		34.8		33.7	31.6	16.1	37.1	37.8		22.8	11.7	
Progression Factor		1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		14.6		41.2	1.7	0.6	1.3	3.3		18.8	0.0	
Delay (s)		49.4		74.9	33.3	16.7	38.5	41.1		41.6	11.7	
Level of Service		D		E	C	B	D	D		D	B	
Approach Delay (s)		49.4			21.1			40.0			40.7	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM Average Control Delay	34.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	93.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	103.7%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

CCTALOS ANALYSIS

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CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: Existing AM                                          02/01/07
========================================================================
INTERSECTION     1 Empire Ave/Oakley Road           Oakley
Count Date                   Time                 Peak Hour AM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                           6-PHASE SIGNAL
-----------           53  237   26
                       |   |    |
            ^          |   |    |         ^
            |       <---   v   --->       | Split? Y
LEFT    50 ---  2.1   1.0  1.0  1.0   1.0 ---   22  RIGHT
                                                         STREET NAME:
THRU     6 ---> 1.1  (NO. OF LANES)   1.1<---   15  THRU  Oakley Road

RIGHT  107 ---  1.0   1.0  2.1  1.1   1.1 ---   12  LEFT
            |       <---   ^   --->       |
            v          |   |    |         v
  N                    |   |    |                        SIG WARRANTS:
W + E                 165  372    5                        Urb=N, Rur=N
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire Ave
```

	MOVEMENT	ORIGINAL VOLUME	ADJUSTED VOLUME*	CAPACITY	V/C RATIO	CRITICAL V/C
NB	RIGHT (R)	5	5	1650	0.0030	
	THRU (T)	372	372	3300	0.1127	
	LEFT (L)	165	165	1650	0.1000	0.1000
	T + R		377	3300	0.1142	
SB	RIGHT (R)	53	26 *	1650	0.0158	
	THRU (T)	237	237	1650	0.1436	0.1436
	LEFT (L)	26	26	1650	0.0158	
EB	RIGHT (R)	107	0 *	1650	0.0000	
	THRU (T)	6	6	1650	0.0036	
	LEFT (L)	50	50	3000	0.0167	
	T + L		56	3000	0.0187	0.0187
WB	RIGHT (R)	22	0 *	1650	0.0000	
	THRU (T)	15	15	1650	0.0091	
	LEFT (L)	12	12	1650	0.0073	
	T + L		27	1650	0.0164	0.0164

TOTAL VOLUME-TO-CAPACITY RATIO: 0.28

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 AM                                            02/01/07
==========================================================================
INTERSECTION     2 Empire Avenue/Main Street        Oakley
Count Date                   Time                 Peak Hour AM
--------------------------------------------------------------------------
CCTA METHOD          RIGHT THRU LEFT                          6-PHASE SIGNAL
-----------             31   35   27
                         |    |    |
             ^           |    |    |         ^
             |       <---    v   --->        | Split? N
LEFT    13 ---  1.0   1.0  1.1  1.1   1.1 ---   13  RIGHT
                                                           STREET NAME:
THRU   680 ---> 2.0  (NO. OF LANES)   2.1<---  820  THRU  Main Street

RIGHT  179 ---  1.0   2.0  1.0  1.0   1.0 ---  102  LEFT
             |       <---    ^   --->        |
             v           |    |    |         v
  N                      |    |    |                      SIG WARRANTS:
W + E                   309   17  118                       Urb=Y, Rur=Y
  S                    LEFT THRU RIGHT Split? Y

               STREET NAME: Empire Avenue
==========================================================================
```

MOVEMENT		ORIGINAL VOLUME	ADJUSTED VOLUME*	CAPACITY	V/C RATIO	CRITICAL V/C
NB	RIGHT (R)	118	16 *	1650	0.0097	
	THRU (T)	17	17	1650	0.0103	
	LEFT (L)	309	309	3000	0.1030	0.1030
SB	RIGHT (R)	31	18 *	1650	0.0109	
	THRU (T)	35	35	1650	0.0212	
	LEFT (L)	27	27	1650	0.0164	
	T + L		62	1650	0.0376	0.0376
EB	RIGHT (R)	179	9 *	1650	0.0055	
	THRU (T)	680	680	3300	0.2061	0.2061
	LEFT (L)	13	13	1650	0.0079	
WB	RIGHT (R)	13	13	1650	0.0079	
	THRU (T)	820	820	3300	0.2485	
	LEFT (L)	102	102	1650	0.0618	0.0618
	T + R		833	3300	0.2524	

TOTAL VOLUME-TO-CAPACITY RATIO: 0.41

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 AM                                          02/01/07
=========================================================================
INTERSECTION     3 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<---  878  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)      878        878       3440     0.2552
    T + R                    969       3440     0.2817     0.2817
=========================================================================
     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 AM                                          02/01/07
=========================================================================
INTERSECTION     4 O'Hara Avenue/Main Street         Oakley
Count Date                   Time                  Peak Hour AM
-------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                         3-PHASE SIGNAL
-----------            0    6    0
                       |    |    |
             ^         |    |    |         ^
             |       <---   v   --->       | Split? N
LEFT     0 ---  1.0   1.1  1.1  1.1   1.1 ---    0  RIGHT
                                                           STREET NAME:
THRU   684 ---> 1.0  (NO. OF LANES)   1.1<---  819  THRU  Main Street

RIGHT  166 ---  1.0   1.0  1.1  1.1   1.0 ---   22  LEFT
             |       <---   ^   --->       |
             v         |    |    |         v
  N                    |    |    |                         SIG WARRANTS:
W + E                 225    0   47                          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)      47         47        1720    0.0273
    THRU (T)        0          0        1720    0.0000
    LEFT (L)      225        225        1720    0.1308     0.1308
    T + R                     47        1720    0.0273
-------------------------------------------------------------------------
SB  RIGHT (R)       0          0        1720    0.0000
    THRU (T)        6          6        1720    0.0035     0.0035
    LEFT (L)        0          0        1720    0.0000
    T + R                      6        1720    0.0035
    T + L                      6        1720    0.0035
    T + R + L                  6        1720    0.0035
-------------------------------------------------------------------------
EB  RIGHT (R)     166          0 *      1720    0.0000
    THRU (T)      684        684        1720    0.3977
    LEFT (L)        0          0        1720    0.0000     0.0000
-------------------------------------------------------------------------
WB  RIGHT (R)       0          0        1720    0.0000
    THRU (T)      819        819        1720    0.4762     0.4762
    LEFT (L)       22         22        1720    0.0128
    T + R                    819        1720    0.4762
=========================================================================
     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 AM                                            02/01/07
==========================================================================
INTERSECTION     5 Main Street/Cypress               Oakley
Count Date                  Time                 Peak Hour AM
--------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                        8-PHASE SIGNAL
-----------            13  352  320
                        |    |    |
             ^          |    |    |         ^
             |       <---    v    --->      | Split? N
LEFT    33 ---  1.0   1.0  2.0  1.0   1.0 ---  374  RIGHT
                                                           STREET NAME:
THRU   233 ---> 1.0  (NO. OF LANES)   1.0<---  196  THRU  Cypress

RIGHT   54 ---  1.0   1.0  2.0  1.0   1.0 ---  129  LEFT
             |       <---    ^    --->      |
             v          |    |    |         v
  N                     |    |    |                        SIG WARRANTS:
W + E                  29  385  185                          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)     185          56 *     1650      0.0339
    THRU (T)      385         385       3300      0.1167      0.1167
    LEFT (L)       29          29       1650      0.0176
--------------------------------------------------------------------------
SB  RIGHT (R)      13           0 *     1650      0.0000
    THRU (T)      352         352       3300      0.1067
    LEFT (L)      320         320       1650      0.1939      0.1939
--------------------------------------------------------------------------
EB  RIGHT (R)      54          25 *     1650      0.0152
    THRU (T)      233         233       1650      0.1412      0.1412
    LEFT (L)       33          33       1650      0.0200
--------------------------------------------------------------------------
WB  RIGHT (R)     374          54 *     1650      0.0327
    THRU (T)      196         196       1650      0.1188
    LEFT (L)      129         129       1650      0.0782      0.0782
==========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                            0.53
     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 PM                                           02/01/07
==========================================================================
INTERSECTION     1 Empire Ave/Oakley Road           Oakley
Count Date                    Time               Peak Hour PM
--------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                         6-PHASE SIGNAL
-----------            61  500  139
                        |    |    |
             ^          |    |    |          ^
             |       <---    v    --->       | Split? Y
LEFT    53 ---  2.1   1.0  1.0  1.0   1.0 ---   53  RIGHT
                                                            STREET NAME:
THRU    46 ---> 1.1  (NO. OF LANES)   1.1<---   62  THRU  Oakley Road

RIGHT  209 ---  1.0   1.0  2.1  1.1   1.1 ---   81  LEFT
             |       <---    ^    --->       |
             v          |    |    |          v
  N                     |    |    |                         SIG WARRANTS:
W + E                 116  304   10                           Urb=B, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire Ave
```

MOVEMENT		ORIGINAL VOLUME	ADJUSTED VOLUME*	CAPACITY	V/C RATIO	CRITICAL V/C
NB	RIGHT (R)	10	10	1650	0.0061	
	THRU (T)	304	304	3300	0.0921	
	LEFT (L)	116	116	1650	0.0703	0.0703
	T + R		314	3300	0.0952	
SB	RIGHT (R)	61	32 *	1650	0.0194	
	THRU (T)	500	500	1650	0.3030	0.3030
	LEFT (L)	139	139	1650	0.0842	
EB	RIGHT (R)	209	93 *	1650	0.0564	0.0564
	THRU (T)	46	46	1650	0.0279	
	LEFT (L)	53	53	3000	0.0177	
	T + L		99	3000	0.0330	
WB	RIGHT (R)	53	0 *	1650	0.0000	
	THRU (T)	62	62	1650	0.0376	
	LEFT (L)	81	81	1650	0.0491	
	T + L		143	1650	0.0867	0.0867

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 PM                                           02/01/07
=========================================================================
INTERSECTION     2 Empire Avenue/Main Street        Oakley
Count Date                   Time                 Peak Hour PM
-------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                          6-PHASE SIGNAL
-----------            15   18   15
                        |    |    |
             ^          |    |    |          ^
             |       <---    v   --->        | Split? N
LEFT    28 ---  1.0   1.0  1.1  1.1   1.1 ---   17  RIGHT
                                                          STREET NAME:
THRU  1127 ---> 2.0  (NO. OF LANES)   2.1<---  674  THRU  Main Street

RIGHT  481 ---  1.0   2.0  1.0  1.0   1.0 ---  201  LEFT
             |       <---    ^   --->        |
             v          |    |    |          v
  N                     |    |    |                       SIG WARRANTS:
W + E                  247   33  130                        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)     130          0 *      1650     0.0000
    THRU (T)       33         33        1650     0.0200
    LEFT (L)      247        247        3000     0.0823     0.0823
-------------------------------------------------------------------------
SB  RIGHT (R)      15          0 *      1650     0.0000
    THRU (T)       18         18        1650     0.0109
    LEFT (L)       15         15        1650     0.0091
    T + L                     33        1650     0.0200     0.0200
-------------------------------------------------------------------------
EB  RIGHT (R)     481        345 *      1650     0.2091
    THRU (T)     1127       1127        3300     0.3415     0.3415
    LEFT (L)       28         28        1650     0.0170
-------------------------------------------------------------------------
WB  RIGHT (R)      17         17        1650     0.0103
    THRU (T)      674        674        3300     0.2042
    LEFT (L)      201        201        1650     0.1218     0.1218
    T + R                    691        3300     0.2094
=========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                            0.57
     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 PM                                            02/01/07
==========================================================================
INTERSECTION     3 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
==========================================================================
```

MOVEMENT	ORIGINAL VOLUME	ADJUSTED VOLUME*	CAPACITY	V/C RATIO	CRITICAL 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 PM                                          02/01/07
=========================================================================
INTERSECTION     4 O'Hara Avenue/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 ---  1.0   1.1  1.1  1.1   1.1 ---    0  RIGHT
                                                          STREET NAME:
THRU   968 ---> 1.0  (NO. OF LANES)   1.1<---  827  THRU  Main Street

RIGHT  181 ---  1.0   1.0  1.1  1.1   1.0 ---   31  LEFT
             |        <---    ^   --->       |
             v           |    |    |         v
  N                      |    |    |                  SIG WARRANTS:
W + E                  220    0   47                    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)      47         47        1720     0.0273
    THRU (T)        0          0        1720     0.0000
    LEFT (L)      220        220        1720     0.1279     0.1279
    T + R                     47        1720     0.0273
-------------------------------------------------------------------------
SB  RIGHT (R)       0          0        1720     0.0000     0.0000
    THRU (T)        0          0        1720     0.0000
    LEFT (L)        0          0        1720     0.0000
    T + R                      0        1720     0.0000
    T + L                      0        1720     0.0000
    T + R + L                  0        1720     0.0000
-------------------------------------------------------------------------
EB  RIGHT (R)     181          0 *      1720     0.0000
    THRU (T)      968        968        1720     0.5628     0.5628
    LEFT (L)        0          0        1720     0.0000
-------------------------------------------------------------------------
WB  RIGHT (R)       0          0        1720     0.0000
    THRU (T)      827        827        1720     0.4808
    LEFT (L)       31         31        1720     0.0180     0.0180
    T + R                    827        1720     0.4808
=========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                            0.71
     INTERSECTION LEVEL OF SERVICE:                               C
=========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=EX.INT,VOL=EX.PM,CAP=
```

CCTALOS Software ver. 2.35 by TJKM Transportation Consultants

Condition: Existing PM 02/01/07

INTERSECTION 5 Main Street/Cypress Oakley
Count Date Time Peak Hour PM

```
CCTA METHOD          RIGHT THRU LEFT                     8-PHASE SIGNAL
-----------             16  465  432
                         |    |    |
             ^           |    |    |         ^
             |       <---    v    --->       | Split? N
LEFT    21 ---  1.0   1.0  2.0  1.0   1.0 ---  462  RIGHT
                                                     STREET NAME:
THRU   173 ---> 1.0  (NO. OF LANES)   1.0<---  168  THRU  Cypress

RIGHT   67 ---  1.0   1.0  2.0  1.0   1.0 ---  113  LEFT
             |       <---    ^    --->       |
             v           |    |    |         v
  N                      |    |    |                     SIG WARRANTS:
W + E                   53  384  122                       Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Main Street
```

MOVEMENT	ORIGINAL VOLUME	ADJUSTED VOLUME*	CAPACITY	V/C RATIO	CRITICAL V/C
NB RIGHT (R)	122	9 *	1650	0.0055	
THRU (T)	384	384	3300	0.1164	0.1164
LEFT (L)	53	53	1650	0.0321	
SB RIGHT (R)	16	0 *	1650	0.0000	
THRU (T)	465	465	3300	0.1409	
LEFT (L)	432	432	1650	0.2618	0.2618
EB RIGHT (R)	67	14 *	1650	0.0085	
THRU (T)	173	173	1650	0.1048	0.1048
LEFT (L)	21	21	1650	0.0127	
WB RIGHT (R)	462	30 *	1650	0.0182	
THRU (T)	168	168	1650	0.1018	
LEFT (L)	113	113	1650	0.0685	0.0685

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: Cumulative NP AM 04/04/07

INTERSECTION 1 Empire Ave/Oakley Road Oakley
Count Date Time Peak Hour AM

```
CCTA METHOD         RIGHT THRU LEFT                    6-PHASE SIGNAL
-----------            60  400   50
                        |   |    |
             ^          |   |    |         ^
             |        <---  v   --->       | Split? Y
LEFT    30 ---  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  230 ---  1.0   1.0  2.1  1.1   1.1 ---   20  LEFT
             |        <---  ^   --->       |
             v          |   |    |         v
  N                     |   |    |                    SIG WARRANTS:
W + E                 660  990   20                     Urb=Y, Rur=Y
  S                   LEFT THRU RIGHT Split? N

               STREET NAME: Empire Ave
```

	MOVEMENT	ORIGINAL VOLUME	ADJUSTED VOLUME*	CAPACITY	V/C RATIO	CRITICAL V/C
NB	RIGHT (R)	20	20	1650	0.0121	
	THRU (T)	990	990	3300	0.3000	
	LEFT (L)	660	660	1650	0.4000	0.4000
	T + R		1010	3300	0.3061	
SB	RIGHT (R)	60	44 *	1650	0.0267	
	THRU (T)	400	400	1650	0.2424	0.2424
	LEFT (L)	50	50	1650	0.0303	
EB	RIGHT (R)	230	0 *	1650	0.0000	
	THRU (T)	10	10	1650	0.0061	
	LEFT (L)	30	30	3000	0.0100	
	T + L		40	3000	0.0133	0.0133
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: 0.67
INTERSECTION LEVEL OF SERVICE: B

* ADJUSTED FOR RIGHT TURN ON RED
INT=CUMNP.INT,VOL=CUMNP.AM,CAP=

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
==============================================================================
Condition: Cumulative NP AM                                           04/04/07
==============================================================================
INTERSECTION     2 Empire Avenue/Main Street         Oakley
Count Date                   Time                Peak Hour AM
------------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                             6-PHASE SIGNAL
-----------            60   50   20
                        |    |    |
             ^          |    |    |         ^
             |       <---    v    --->      | Split? N
LEFT    20 ---  1.0   1.0  1.1  1.1   1.1 ---   20  RIGHT
                                                      STREET NAME:
THRU   810 ---> 2.0  (NO. OF LANES)   2.1<---  890  THRU  Main Street

RIGHT  280 ---  1.0   2.0  1.0  1.0   1.0 ---  180  LEFT
             |       <---    ^    --->      |
             v          |    |    |         v
  N                     |    |    |                       SIG WARRANTS:
W + E                  940   30  170                        Urb=Y, Rur=Y
  S                    LEFT THRU RIGHT Split? Y

               STREET NAME: Empire Avenue
```

	MOVEMENT	ORIGINAL VOLUME	ADJUSTED VOLUME*	CAPACITY	V/C RATIO	CRITICAL V/C
NB	RIGHT (R)	170	0 *	1650	0.0000	
	THRU (T)	30	30	1650	0.0182	
	LEFT (L)	940	940	3000	0.3133	0.3133
SB	RIGHT (R)	60	40 *	1650	0.0242	
	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)	280	0 *	1650	0.0000	
	THRU (T)	810	810	3300	0.2455	0.2455
	LEFT (L)	20	20	1650	0.0121	
WB	RIGHT (R)	20	20	1650	0.0121	
	THRU (T)	890	890	3300	0.2697	
	LEFT (L)	180	180	1650	0.1091	0.1091
	T + R		910	3300	0.2758	

TOTAL VOLUME-TO-CAPACITY RATIO: 0.71

INTERSECTION LEVEL OF SERVICE: C

* ADJUSTED FOR RIGHT TURN ON RED

INT=CUMNP.INT,VOL=CUMNP.AM,CAP=

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
=========================================================================
Condition: Cumulative NP AM                                      04/04/07
=========================================================================
INTERSECTION     3 Vintage/Main Street            Oakley
Count Date                   Time               Peak Hour AM
-------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                        3-PHASE SIGNAL
-----------           150    0   70
                        |    |    |
             ^          |    |    |         ^
             |       <---    v   --->       | Split? N
LEFT   100 ---  1.0   1.0  0.0  1.0   1.1 ---   20  RIGHT
                                                       STREET NAME:
THRU   960 ---> 1.0  (NO. OF LANES)   1.1<---  930  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
```

MOVEMENT	ORIGINAL VOLUME	ADJUSTED VOLUME*	CAPACITY	V/C RATIO	CRITICAL V/C
SB RIGHT (R)	150	50 *	1720	0.0291	
LEFT (L)	70	70	1720	0.0407	0.0407
EB THRU (T)	960	960	1720	0.5581	
LEFT (L)	100	100	1720	0.0581	0.0581
WB RIGHT (R)	20	20	1720	0.0116	
THRU (T)	930	930	1720	0.5407	
T + R		950	1720	0.5523	0.5523

TOTAL VOLUME-TO-CAPACITY RATIO: 0.65

INTERSECTION LEVEL OF SERVICE: B

* ADJUSTED FOR RIGHT TURN ON RED

INT=CUMNP.INT,VOL=CUMNP.AM,CAP=

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
==========================================================================
Condition: Cumulative NP AM                                       04/04/07
==========================================================================
INTERSECTION     4 O'Hara Avenue/Main Street         Oakley
Count Date                  Time                 Peak Hour AM
--------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                          3-PHASE SIGNAL
-----------            0    0    0
                       |    |    |
             ^         |    |    |         ^
             |      <---    v    --->      | Split? N
LEFT    10 ---  1.0   1.1  1.1  1.1   1.1 ---   20  RIGHT
                                                             STREET NAME:
THRU   920 ---> 1.0  (NO. OF LANES)   1.1<---  870  THRU     Main Street

RIGHT  120 ---  1.0   1.0  1.1  1.1   1.0 ---   30  LEFT
             |      <---    ^    --->      |
             v         |    |    |         v
  N                    |    |    |                           SIG WARRANTS:
W + E                 100   10   30                            Urb=N, Rur=Y
  S                   LEFT THRU RIGHT Split? N

               STREET NAME: O'Hara Avenue
==========================================================================
```

	MOVEMENT	ORIGINAL VOLUME	ADJUSTED VOLUME*	CAPACITY	V/C RATIO	CRITICAL V/C
NB	RIGHT (R)	30	30	1720	0.0174	
	THRU (T)	10	10	1720	0.0058	
	LEFT (L)	100	100	1720	0.0581	0.0581
	T + R		40	1720	0.0233	
SB	RIGHT (R)	0	0	1720	0.0000	0.0000
	THRU (T)	0	0	1720	0.0000	
	LEFT (L)	0	0	1720	0.0000	
	T + R		0	1720	0.0000	
	T + L		0	1720	0.0000	
	T + R + L		0	1720	0.0000	
EB	RIGHT (R)	120	20 *	1720	0.0116	
	THRU (T)	920	920	1720	0.5349	0.5349
	LEFT (L)	10	10	1720	0.0058	
WB	RIGHT (R)	20	20	1720	0.0116	
	THRU (T)	870	870	1720	0.5058	
	LEFT (L)	30	30	1720	0.0174	0.0174
	T + R		890	1720	0.5174	

```
==========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                               0.61
     INTERSECTION LEVEL OF SERVICE:                                  B
==========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=CUMNP.INT,VOL=CUMNP.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
=========================================================================
Condition: Cumulative NP AM                                      04/04/07
=========================================================================
INTERSECTION     5 Main Street/Cypress              Oakley
Count Date                    Time                Peak Hour AM
-------------------------------------------------------------------------
CCTA METHOD          RIGHT THRU LEFT                          8-PHASE SIGNAL
-----------             10  530  460
                         |    |    |
             ^           |    |    |         ^
             |       <---    v   --->        | Split? N
LEFT    30 ---  1.0   1.1  2.1  2.0   2.1 ---  430  RIGHT
                                                          STREET NAME:
THRU   210 ---> 2.1  (NO. OF LANES)   1.1<---  690  THRU  Cypress

RIGHT   60 ---  1.1   1.0  2.0  1.0   1.0 ---  580  LEFT
             |       <---    ^   --->        |
             v           |    |    |         v
  N                      |    |    |                      SIG WARRANTS:
W + E                   80  450  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)      450        450       3300     0.1364     0.1364
    LEFT (L)       80         80       1650     0.0485
-------------------------------------------------------------------------
SB  RIGHT (R)      10         10       1650     0.0061
    THRU (T)      530        530       3300     0.1606
    LEFT (L)      460        460       3000     0.1533     0.1533
    T + R                    540       3300     0.1636
-------------------------------------------------------------------------
EB  RIGHT (R)      60         60       1650     0.0364
    THRU (T)      210        210       3300     0.0636
    LEFT (L)       30         30       1650     0.0182     0.0182
    T + R                    270       3300     0.0818
-------------------------------------------------------------------------
WB  RIGHT (R)     430        177 *     3000     0.0590
    THRU (T)      690        690       1650     0.4182     0.4182
    LEFT (L)      580        580       1650     0.3515
    T + R                    867       3000     0.2890
=========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                           0.73
     INTERSECTION LEVEL OF SERVICE:                               C
=========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=CUMNP.INT,VOL=CUMNP.AM,CAP=
```

CCTALOS Software ver. 2.35 by TJKM Transportation Consultants

Condition: Cumulative No Project Conditions - PM Peak Hour   04/08/07

```
INTERSECTION     1 Empire Ave/Oakley Road           Oakley
Count Date                   Time               Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                        6-PHASE SIGNAL
-----------           120 1170  140
                        |    |    |
             ^          |    |    |         ^
             |        <---   v   --->       | Split? Y
LEFT   130 ---  2.1   1.0  1.0  1.0   1.0 ---   90  RIGHT
                                                           STREET NAME:
THRU    60 ---> 1.1  (NO. OF LANES)   1.1<---   50  THRU  Oakley Road

RIGHT  510 ---  1.0   1.0  2.1  1.1   1.1 ---   80  LEFT
             |        <---   ^   --->       |
             v          |    |    |         v
  N                     |    |    |                    SIG WARRANTS:
W + E                 410  880   30                      Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire Ave
```

MOVEMENT		ORIGINAL VOLUME	ADJUSTED VOLUME*	CAPACITY	V/C RATIO	CRITICAL V/C
NB	RIGHT (R)	30	30	1650	0.0182	
	THRU (T)	880	880	3300	0.2667	
	LEFT (L)	410	410	1650	0.2485	0.2485
	T + R		910	3300	0.2758	
SB	RIGHT (R)	120	49 *	1650	0.0297	
	THRU (T)	1170	1170	1650	0.7091	0.7091
	LEFT (L)	140	140	1650	0.0848	
EB	RIGHT (R)	510	100 *	1650	0.0606	
	THRU (T)	60	60	1650	0.0364	
	LEFT (L)	130	130	3000	0.0433	
	T + L		190	3000	0.0633	0.0633
WB	RIGHT (R)	90	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: 1.10

INTERSECTION LEVEL OF SERVICE: F

* ADJUSTED FOR RIGHT TURN ON RED

INT=CUMNP.INT,VOL=CUMNP.PM,CAP=

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: Cumulative No Project Conditions - PM Peak Hou      04/08/07
========================================================================
INTERSECTION     2 Empire Avenue/Main Street         Oakley
Count Date                   Time                  Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                          6-PHASE SIGNAL
-----------            40   40   20
                        |    |    |
             ^          |    |    |         ^
             |       <---    v    --->      | Split? N
LEFT    50 ---  1.0   1.0  1.1  1.1   1.1 ---   20  RIGHT
                                                        STREET NAME:
THRU  1240 ---> 2.0  (NO. OF LANES)   2.1<---  950  THRU  Main Street

RIGHT 1100 ---  1.0   2.0  1.0  1.0   1.0 ---  290  LEFT
             |       <---    ^    --->      |
             v          |    |    |         v
  N                     |    |    |                     SIG WARRANTS:
W + E                 750   60  290                       Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? Y

               STREET NAME: Empire Avenue
```

MOVEMENT	ORIGINAL VOLUME	ADJUSTED VOLUME*	CAPACITY	V/C RATIO	CRITICAL V/C
NB RIGHT (R)	290	0 *	1650	0.0000	
THRU (T)	60	60	1650	0.0364	
LEFT (L)	750	750	3000	0.2500	0.2500
SB RIGHT (R)	40	0 *	1650	0.0000	
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)	1100	688 *	1650	0.4170	0.4170
THRU (T)	1240	1240	3300	0.3758	
LEFT (L)	50	50	1650	0.0303	
WB RIGHT (R)	20	20	1650	0.0121	
THRU (T)	950	950	3300	0.2879	
LEFT (L)	290	290	1650	0.1758	0.1758
T + R		970	3300	0.2939	

TOTAL VOLUME-TO-CAPACITY RATIO: 0.88

INTERSECTION LEVEL OF SERVICE: D

* ADJUSTED FOR RIGHT TURN ON RED

INT=CUMNP.INT,VOL=CUMNP.PM,CAP=

CCTALOS Software ver. 2.35 by TJKM Transportation Consultants

```
==========================================================================
Condition: Cumulative No Project Conditions - PM Peak Hou        04/08/07
==========================================================================
INTERSECTION     3 Vintage/Main Street                Oakley
Count Date                   Time                Peak Hour PM
--------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                          3-PHASE SIGNAL
-----------            80    0   80
                        |    |    |
             ^          |    |    |         ^
             |       <---    v   --->       | Split? N
LEFT   100 ---  1.0   1.0  0.0  1.0   1.1 ---   60  RIGHT
                                                             STREET NAME:
THRU  1430 ---> 2.0  (NO. OF LANES)   2.1<--- 1280  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=B, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Vintage
==========================================================================
```

	MOVEMENT	ORIGINAL VOLUME	ADJUSTED VOLUME*	CAPACITY	V/C RATIO	CRITICAL V/C
SB	RIGHT (R)	80	0 *	1720	0.0000	
	LEFT (L)	80	80	1720	0.0465	0.0465
EB	THRU (T)	1430	1430	3440	0.4157	
	LEFT (L)	100	100	1720	0.0581	0.0581
WB	RIGHT (R)	60	60	1720	0.0349	
	THRU (T)	1280	1280	3440	0.3721	
	T + R		1340	3440	0.3895	0.3895

TOTAL VOLUME-TO-CAPACITY RATIO: 0.49

INTERSECTION LEVEL OF SERVICE: A

* ADJUSTED FOR RIGHT TURN ON RED

INT=CUMNP.INT,VOL=CUMNP.PM,CAP=

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
==========================================================================
Condition: Cumulative No Project Conditions - PM Peak Hou       04/08/07
==========================================================================
INTERSECTION     4 O'Hara Avenue/Main Street         Oakley
Count Date                    Time                Peak Hour PM
--------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                          3-PHASE SIGNAL
-----------             0    0    0
                        |    |    |
             ^          |    |    |         ^
             |       <---    v    --->      | Split? N
LEFT    20 ---  1.0   1.1  1.1  1.1   1.1 ---   20  RIGHT
                                                             STREET NAME:
THRU  1380 ---> 1.0  (NO. OF LANES)   1.1<--- 1170  THRU  Main Street

RIGHT  120 ---  1.0   1.0  1.1  1.1   1.0 ---   30  LEFT
             |       <---    ^    --->      |
             v          |    |    |         v
  N                     |    |    |                          SIG WARRANTS:
W + E                 210   30   30                            Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: O'Hara Avenue
```

	MOVEMENT	ORIGINAL VOLUME	ADJUSTED VOLUME*	CAPACITY	V/C RATIO	CRITICAL V/C
NB	RIGHT (R)	30	30	1720	0.0174	
	THRU (T)	30	30	1720	0.0174	
	LEFT (L)	210	210	1720	0.1221	0.1221
	T + R		60	1720	0.0349	
SB	RIGHT (R)	0	0	1720	0.0000	0.0000
	THRU (T)	0	0	1720	0.0000	
	LEFT (L)	0	0	1720	0.0000	
	T + R		0	1720	0.0000	
	T + L		0	1720	0.0000	
	T + R + L		0	1720	0.0000	
EB	RIGHT (R)	120	0 *	1720	0.0000	
	THRU (T)	1380	1380	1720	0.8023	0.8023
	LEFT (L)	20	20	1720	0.0116	
WB	RIGHT (R)	20	20	1720	0.0116	
	THRU (T)	1170	1170	1720	0.6802	
	LEFT (L)	30	30	1720	0.0174	0.0174
	T + R		1190	1720	0.6919	

TOTAL VOLUME-TO-CAPACITY RATIO: 0.94

INTERSECTION LEVEL OF SERVICE: E

* ADJUSTED FOR RIGHT TURN ON RED

INT=CUMNP.INT,VOL=CUMNP.PM,CAP=

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
=========================================================================
Condition: Cumulative No Project Conditions - PM Peak Hou      04/08/07
=========================================================================
INTERSECTION     5 Main Street/Cypress              Oakley
Count Date                  Time                Peak Hour PM
-------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                        8-PHASE SIGNAL
-----------            20  840  500
                        |    |    |
             ^          |    |    |         ^
             |       <---    v    --->      | Split? N
LEFT   100 ---  1.0   1.1  2.1  2.0   2.1 ---  660  RIGHT
                                                           STREET NAME:
THRU   770 ---> 2.1  (NO. OF LANES)   1.1<---  440  THRU  Cypress

RIGHT   40 ---  1.1   1.0  2.0  1.0   1.0 ---  320  LEFT
             |       <---    ^    --->      |
             v          |    |    |         v
  N                     |    |    |                        SIG WARRANTS:
W + E                  140  520  590                         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)     590        270 *      1650     0.1636
    THRU (T)      520        520        3300     0.1576
    LEFT (L)      140        140        1650     0.0848      0.0848
-------------------------------------------------------------------------
SB  RIGHT (R)      20         20        1650     0.0121
    THRU (T)      840        840        3300     0.2545
    LEFT (L)      500        500        3000     0.1667
    T + R                    860        3300     0.2606      0.2606
-------------------------------------------------------------------------
EB  RIGHT (R)      40         40        1650     0.0242
    THRU (T)      770        770        3300     0.2333
    LEFT (L)      100        100        1650     0.0606
    T + R                    810        3300     0.2455      0.2455
-------------------------------------------------------------------------
WB  RIGHT (R)     660        385 *      3000     0.1283
    THRU (T)      440        440        1650     0.2667
    LEFT (L)      320        320        1650     0.1939      0.1939
    T + R                    825        3000     0.2750
=========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                           0.78
     INTERSECTION LEVEL OF SERVICE:                               C
=========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=CUMNP.INT,VOL=CUMNP.PM,CAP=
```

```
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
                  CCTALOS Method (Base Volume Alternative)
********************************************************************************
Intersection #1
********************************************************************************
Cycle (sec):         100                Critical Vol./Cap.(X):        0.571
Loss Time (sec):       0 (Y+R=4.0 sec)  Average Delay (sec/veh):     xxxxxx
Optimal Cycle:        53                Level Of Service:                 A
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected       Split Phase      Split Phase
Rights:           Include          Include          Include          Include
Min. Green:     0    0     0    0    0     0    0    0     0    0    0     0
Lanes:        1  0  1  1  0   1  0  1  0  1   1  1  0  0  1   0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     410  620    20    50  420   180   140   10   240    20   10    20
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  410  620    20    50  420   180   140   10   240    20   10    20
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:   410  620    20    50  420   180   140   10   240    20   10    20
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  410  620    20    50  420   180   140   10   240    20   10    20
RTOR Reduct:    0    0     0     0    0    77     0    0   240     0    0    20
RTOR Vol:     410  620    20    50  420   103   140   10     0    20   10     0
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:  410  620    20    50  420   103   140   10     0    20   10     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1650 1650  1650  1650 1650  1650  1650 1650  1650  1650 1650  1650
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  0.91 1.00  1.00  1.00 1.00  1.00
Lanes:       1.00 1.94  0.06  1.00 1.00  1.00  1.87 0.13  1.00  0.67 0.33  1.00
Final Sat.:  1650 3197   103  1650 1650  1650  2800  220  1650  1100  550  1650
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.25 0.19  0.19  0.03 0.25  0.06  0.05 0.05  0.00  0.02 0.02  0.00
Crit Volume:  410                    420         75                      30
Crit Moves:  ****                   ****       ****                    ****
********************************************************************************
```

```
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
                  CCTALOS Method (Base Volume Alternative)
********************************************************************************
Intersection #2
********************************************************************************
Cycle (sec):          100                Critical Vol./Cap.(X):        0.677
Loss Time (sec):        0 (Y+R=4.0 sec)  Average Delay (sec/veh):     xxxxxx
Optimal Cycle:         71                Level Of Service:                 B
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Split Phase      Split Phase       Protected        Protected
Rights:           Include          Include          Include          Include
Min. Green:     0     0     0    0     0     0    0     0     0    0     0     0
Lanes:        2  0  1  0  1   0  1  0  0  1   1  0  2  0  1   1  0  1  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     550    30   200    20    50    60    20   850   280   320  1250    20
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  550    30   200    20    50    60    20   850   280   320  1250    20
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:   550    30   200    20    50    60    20   850   280   320  1250    20
Reduct Vol:     0     0     0     0     0     0     0     0     0     0     0     0
Reduced Vol:  550    30   200    20    50    60    20   850   280   320  1250    20
RTOR Reduct:    0     0   200     0     0    20     0     0   280     0     0     0
RTOR Vol:     550    30     0    20    50    40    20   850     0   320  1250    20
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:  550    30     0    20    50    40    20   850     0   320  1250    20
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1650 1650  1650  1650 1650  1650  1650 1650  1650  1650 1650  1650
Adjustment:  0.91 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       2.00 1.00  1.00  0.29 0.71  1.00  1.00 2.00  1.00  1.00 1.97  0.03
Final Sat.:  3000 1650  1650   471 1179  1650  1650 3300  1650  1650 3248    52
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.18 0.02  0.00  0.04 0.04  0.02  0.01 0.26  0.00  0.19 0.38  0.38
Crit Volume:  275                      70               425         320
Crit Moves:  ****                    ****              ****        ****
********************************************************************************
```

```
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
                  CCTALOS Method (Base Volume Alternative)
********************************************************************************
Intersection #7
********************************************************************************
Cycle (sec):         100                Critical Vol./Cap.(X):        0.734
Loss Time (sec):       0 (Y+R=4.0 sec)  Average Delay (sec/veh):     xxxxxx
Optimal Cycle:        86                Level Of Service:                 C
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:            Ovl              Include          Include           Ovl
Min. Green:     0    0     0    0    0     0    0    0     0    0    0     0
Lanes:        1  0  2  0  1   2  0  1  1  0   1  0  1  1  0   1  0  0  1  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     100  560   210   470  550    10    50  220    70   380  310  1080
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  100  560   210   470  550    10    50  220    70   380  310  1080
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:   100  560   210   470  550    10    50  220    70   380  310  1080
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  100  560   210   470  550    10    50  220    70   380  310  1080
RTOR Reduct:    0    0   210     0    0     0     0    0     0     0    0   259
RTOR Vol:     100  560     0   470  550    10    50  220    70   380  310   822
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:  100  560     0   470  550    10    50  220    70   380  310   822
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1650 1650  1650  1650 1650  1650  1650 1650  1650  1650 1650  1650
Adjustment:  1.00 1.00  1.00  0.91 1.00  1.00  1.00 1.00  1.00  1.00 1.00  0.91
Lanes:       1.00 2.00  1.00  2.00 1.96  0.04  1.00 1.52  0.48  1.00 0.55  1.45
Final Sat.:  1650 3300  1650  3000 3241    59  1650 2503   797  1650  904  2178
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.06 0.17  0.00  0.16 0.17  0.17  0.03 0.09  0.09  0.23 0.34  0.38
Crit Volume:       280         235               50                         566
Crit Moves:       ****        ****              ****                       ****
********************************************************************************
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                     Level Of Service Computation Report
                  CCTALOS Method (Base Volume Alternative)
********************************************************************************
Intersection #9
********************************************************************************
Cycle (sec):          100               Critical Vol./Cap.(X):         0.640
Loss Time (sec):        0 (Y+R=4.0 sec) Average Delay (sec/veh):      xxxxxx
Optimal Cycle:         52               Level Of Service:                  B
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:         Permitted        Permitted        Protected        Protected
Rights:           Include          Include          Include          Include
Min. Green:    0    0     0    0    0     0    0    0     0    0    0     0
Lanes:        0  1  0  0  1   0  0  1! 0  0   1  0  1  1  0   1  0  1  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     300    0    10    10   10    20    10  430   600    10 1490    10
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  300    0    10    10   10    20    10  430   600    10 1490    10
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:   300    0    10    10   10    20    10  430   600    10 1490    10
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  300    0    10    10   10    20    10  430   600    10 1490    10
RTOR Reduct:    0    0    10     0    0     0     0    0     0     0    0     0
RTOR Vol:     300    0     0    10   10    20    10  430   600    10 1490    10
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:  300    0     0    10   10    20    10  430   600    10 1490    10
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1720 1720  1720  1720 1720  1720  1720 1720  1720  1720 1720  1720
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       1.00 0.00  1.00  0.25 0.25  0.50  1.00 1.00  1.00  1.00 1.99  0.01
Final Sat.:  1720    0  1720   430  430   860  1720 1720  1720  1720 3417    23
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.17 0.00  0.00  0.02 0.02  0.02  0.01 0.25  0.35  0.01 0.44  0.44
Crit Volume:  300                    40          10                          750
Crit Moves:  ****                  ****        ****                         ****
********************************************************************************
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--------------------------------------------------------------------------------
                     Level Of Service Computation Report
                  CCTALOS Method (Base Volume Alternative)
********************************************************************************
Intersection #10
********************************************************************************
Cycle (sec):          100                 Critical Vol./Cap.(X):         0.591
Loss Time (sec):        0 (Y+R=4.0 sec)  Average Delay (sec/veh):      xxxxxx
Optimal Cycle:         45                 Level Of Service:                  A
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Protected        Protected        Protected
Rights:          Include          Include          Include          Include
Min. Green:     0    0     0    0    0     0    0    0     0    0    0     0
Lanes:        0  1  0  0  1   1  0  0  1  0   1  0  1  1  0   1  0  1  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      10   50    60   90   40    40   40  390    40   20 1470   100
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:   10   50    60   90   40    40   40  390    40   20 1470   100
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Volume:    10   50    60   90   40    40   40  390    40   20 1470   100
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:   10   50    60   90   40    40   40  390    40   20 1470   100
RTOR Reduct:    0    0    20    0    0     0    0    0     0    0    0     0
RTOR Vol:      10   50    40   90   40    40   40  390    40   20 1470   100
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:   10   50    40   90   40    40   40  390    40   20 1470   100
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1650 1650  1650 1650 1650  1650 1650 1650  1650 1650 1650  1650
Adjustment:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Lanes:       0.17 0.83  1.00 1.00 0.50  0.50 1.00 1.81  0.19 1.00 1.87  0.13
Final Sat.:   275 1375  1650 1650  825   825 1650 2993   307 1650 3090   210
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.04 0.04  0.02 0.05 0.05  0.05 0.02 0.13  0.13 0.01 0.48  0.48
Crit Volume:        60         90               40                          785
Crit Moves:        ****       ****             ****                        ****
********************************************************************************
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                     Level Of Service Computation Report
                  CCTALOS Method (Base Volume Alternative)
********************************************************************************
Intersection #11
********************************************************************************
Cycle (sec):         100                Critical Vol./Cap.(X):        0.500
Loss Time (sec):       0 (Y+R=4.0 sec)  Average Delay (sec/veh):     xxxxxx
Optimal Cycle:        37                Level Of Service:                 A
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Protected        Protected
Rights:          Include          Include          Include          Include
Min. Green:    0    0     0    0    0     0    0    0     0    0    0     0
Lanes:        1  0  0  1  0   1  0  0  1  0   1  0  2  0  1   1  0  1  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      70   10    60    10   10    10    10  460    70   100 1510    10
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   70   10    60    10   10    10    10  460    70   100 1510    10
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:    70   10    60    10   10    10    10  460    70   100 1510    10
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   70   10    60    10   10    10    10  460    70   100 1510    10
RTOR Reduct:    0    0     0     0    0     0     0    0    70     0    0     0
RTOR Vol:      70   10    60    10   10    10    10  460     0   100 1510    10
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:   70   10    60    10   10    10    10  460     0   100 1510    10
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1720 1720  1720  1720 1720  1720  1720 1720  1720  1720 1720  1720
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       1.00 0.14  0.86  1.00 0.50  0.50  1.00 2.00  1.00  1.00 1.99  0.01
Final Sat.:  1720  246  1474  1720  860   860  1720 3440  1720  1720 3417    23
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.04 0.04  0.04  0.01 0.01  0.01  0.01 0.13  0.00  0.06 0.44  0.44
Crit Volume:   70                    20          10                    760
Crit Moves:  ****                  ****        ****                  ****
********************************************************************************
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                     Level Of Service Computation Report
                  CCTALOS Method (Base Volume Alternative)
********************************************************************************
Intersection #12
********************************************************************************
Cycle (sec):          100                Critical Vol./Cap.(X):         0.594
Loss Time (sec):        0 (Y+R=4.0 sec)  Average Delay (sec/veh):      xxxxxx
Optimal Cycle:         36                Level Of Service:                  A
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:    0    0     0    0    0     0    0    0     0    0    0     0
Lanes:        1  0  0  0  1   0  0  0  0  0   0  0  2  0  1   1  0  2  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      20    0   460    0    0     0    0  490    40  200 1620     0
Growth Adj:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Initial Bse:   20    0   460    0    0     0    0  490    40  200 1620     0
User Adj:    1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
PHF Volume:    20    0   460    0    0     0    0  490    40  200 1620     0
Reduct Vol:     0    0     0    0    0     0    0    0     0    0    0     0
Reduced Vol:   20    0   460    0    0     0    0  490    40  200 1620     0
RTOR Reduct:    0    0   200    0    0     0    0    0    20    0    0     0
RTOR Vol:      20    0   260    0    0     0    0  490    20  200 1620     0
PCE Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
FinalVolume:   20    0   260    0    0     0    0  490    20  200 1620     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1800 1800  1800 1800 1800  1800 1800 1800  1800 1800 1800  1800
Adjustment:  1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00
Lanes:       1.00 0.00  1.00 0.00 0.00  0.00 0.00 2.00  1.00 1.00 2.00  0.00
Final Sat.:  1800    0  1800    0    0     0    0 3600  1800 1800 3600     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.01 0.00  0.14 0.00 0.00  0.00 0.00 0.14  0.01 0.11 0.45  0.00
Crit Volume:             260    0                  0                810
Crit Moves:             ****                    ****                ****
********************************************************************************
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Level Of Service Computation Report
CCTALOS Method (Base Volume Alternative)

Intersection #5

Cycle (sec):	100	Critical Vol./Cap.(X):	0.658
Loss Time (sec):	0 (Y+R=4.0 sec)	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	54	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:		Split Phase			Split Phase			Permitted			Permitted	
Rights:		Include			Include			Include			Include	
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:		1 0 0 1 0			2 0 0 1 0			0 1 0 1 0			1 0 1 0 2	
Volume Module:												
Base Vol:	120	60	40	490	20	20	10	420	80	80	120	1600
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	120	60	40	490	20	20	10	420	80	80	120	1600
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	120	60	40	490	20	20	10	420	80	80	120	1600
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	120	60	40	490	20	20	10	420	80	80	120	1600
RTOR Reduct:	0	0	0	0	0	0	0	0	0	0	0	270
RTOR Vol:	120	60	40	490	20	20	10	420	80	80	120	1331
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	120	60	40	490	20	20	10	420	80	80	120	1331
Saturation Flow Module:												
Sat/Lane:	1720	1720	1720	1720	1720	1720	1720	1720	1720	1720	1720	1720
Adjustment:	1.00	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91
Lanes:	1.00	0.60	0.40	2.00	0.50	0.50	0.04	1.65	0.31	1.00	1.00	2.00
Final Sat.:	1720	1032	688	3127	860	860	67	2833	540	1720	1720	3127
Capacity Analysis Module:												
Vol/Sat:	0.07	0.06	0.06	0.16	0.02	0.02	0.15	0.15	0.15	0.05	0.07	0.43
Crit Volume:	120			245			10					665
Crit Moves:	****			****			****					****

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                    Level Of Service Computation Report
                 CCTALOS Method (Base Volume Alternative)
********************************************************************************
Intersection #1
********************************************************************************
Cycle (sec):          100                Critical Vol./Cap.(X):        0.881
Loss Time (sec):        0 (Y+R=4.0 sec)  Average Delay (sec/veh):     xxxxxx
Optimal Cycle:        180                Level Of Service:                 D
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R   L  -  T  -  R   L  -  T  -  R   L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected       Split Phase      Split Phase
Rights:           Include          Include          Include          Include
Min. Green:     0    0     0    0    0     0    0    0     0    0    0     0
Lanes:        1  0  1  1  0   1  0  1  0  1   1  1  0  0  1   0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     390  810    30   150  730   160   310   60   410    80   50    80
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  390  810    30   150  730   160   310   60   410    80   50    80
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:   390  810    30   150  730   160   310   60   410    80   50    80
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  390  810    30   150  730   160   310   60   410    80   50    80
RTOR Reduct:    0    0     0     0    0   160     0    0   390     0    0    80
RTOR Vol:     390  810    30   150  730     0   310   60    20    80   50     0
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:  390  810    30   150  730     0   310   60    20    80   50     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1650 1650  1650  1650 1650  1650  1650 1650  1650  1650 1650  1650
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  0.91 1.00  1.00  1.00 1.00  1.00
Lanes:       1.00 1.93  0.07  1.00 1.00  1.00  1.68 0.32  1.00  0.62 0.38  1.00
Final Sat.:  1650 3182   118  1650 1650  1650  2513  535  1650  1015  635  1650
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.24 0.25  0.25  0.09 0.44  0.00  0.12 0.11  0.01  0.08 0.08  0.00
Crit Volume:  390                    730         185                  130
Crit Moves:  ****                   ****        ****                 ****
********************************************************************************
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                    Level Of Service Computation Report
                 CCTALOS Method (Base Volume Alternative)
********************************************************************************
Intersection #2
********************************************************************************
Cycle (sec):         100                 Critical Vol./Cap.(X):        1.014
Loss Time (sec):       0 (Y+R=4.0 sec)  Average Delay (sec/veh):     xxxxxx
Optimal Cycle:       180                 Level Of Service:                 F
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Split Phase      Split Phase        Protected         Protected
Rights:           Include          Include          Include           Include
Min. Green:     0    0     0     0    0     0     0    0     0     0    0     0
Lanes:        2  0  1  0  1    0  1  0  0  1    1  0  2  0  1    1  0  1  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     650   60   490    40   30    30    40 1690   610   400 1220    30
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse: 650   60   490    40   30    30    40 1690   610   400 1220    30
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:   650   60   490    40   30    30    40 1690   610   400 1220    30
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol: 650   60   490    40   30    30    40 1690   610   400 1220    30
RTOR Reduct:    0    0   400     0    0    30     0    0   358     0    0     0
RTOR Vol:     650   60    90    40   30     0    40 1690   253   400 1220    30
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume: 650   60    90    40   30     0    40 1690   253   400 1220    30
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1650 1650  1650  1650 1650  1650  1650 1650  1650  1650 1650  1650
Adjustment:  0.91 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       2.00 1.00  1.00  0.57 0.43  1.00  1.00 2.00  1.00  1.00 1.95  0.05
Final Sat.:  3000 1650  1650   943  707  1650  1650 3300  1650  1650 3221    79
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.22 0.04  0.05  0.04 0.04  0.00  0.02 0.51  0.15  0.24 0.38  0.38
Crit Volume: 325                     70               845         400
Crit Moves:  ****                  ****             ****        ****
********************************************************************************
```

Level Of Service Computation Report
CCTALOS Method (Base Volume Alternative)

Intersection #7

Cycle (sec):	100	Critical Vol./Cap.(X):	0.879
Loss Time (sec):	0 (Y+R=4.0 sec)	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	180	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:		Protected			Protected			Protected			Protected	
Rights:		Ovl			Include			Include			Ovl	
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	2 0	1	2 0	1 1	0	1 0	1 1	0	1 0	0 1	1
Volume Module:												
Base Vol:	160	640	420	1000	1040	30	110	480	100	290	450	830
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	160	640	420	1000	1040	30	110	480	100	290	450	830
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	160	640	420	1000	1040	30	110	480	100	290	450	830
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	160	640	420	1000	1040	30	110	480	100	290	450	830
RTOR Reduct:	0	0	290	0	0	0	0	0	0	0	0	550
RTOR Vol:	160	640	130	1000	1040	30	110	480	100	290	450	280
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	160	640	130	1000	1040	30	110	480	100	290	450	280
Saturation Flow Module:												
Sat/Lane:	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Adjustment:	1.00	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91
Lanes:	1.00	2.00	1.00	2.00	1.94	0.06	1.00	1.66	0.34	1.00	1.00	1.00
Final Sat.:	1650	3300	1650	3000	3207	93	1650	2731	569	1650	1650	1500
Capacity Analysis Module:												
Vol/Sat:	0.10	0.19	0.08	0.33	0.32	0.32	0.07	0.18	0.18	0.18	0.27	0.19
Crit Volume:		320		500				290		290		
Crit Moves:		****		****				****		****		

```
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
                  CCTALOS Method (Base Volume Alternative)
********************************************************************************
Intersection #9
********************************************************************************
Cycle (sec):         100              Critical Vol./Cap.(X):         0.878
Loss Time (sec):       0 (Y+R=4.0 sec) Average Delay (sec/veh):      xxxxxx
Optimal Cycle:       152              Level Of Service:                  D
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Protected        Protected
Rights:           Include          Include          Include          Include
Min. Green:     0    0     0    0    0     0    0    0     0    0    0     0
Lanes:        0  1  0  0  1    0  0  1! 0  0    1  0  1  1  0    1  0  1  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     300   10    10    40   10    60    60 1660   520    10 1320    40
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  300   10    10    40   10    60    60 1660   520    10 1320    40
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:   300   10    10    40   10    60    60 1660   520    10 1320    40
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  300   10    10    40   10    60    60 1660   520    10 1320    40
RTOR Reduct:    0    0    10     0    0     0     0    0     0     0    0     0
RTOR Vol:     300   10     0    40   10    60    60 1660   520    10 1320    40
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:  300   10     0    40   10    60    60 1660   520    10 1320    40
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1720 1720  1720  1720 1720  1720  1720 1720  1720  1720 1720  1720
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.97 0.03  1.00  0.36 0.09  0.55  1.00 1.52  0.48  1.00 1.94  0.06
Final Sat.:  1665   55  1720   625  156   938  1720 2619   821  1720 3339   101
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.18 0.18  0.00  0.06 0.06  0.06  0.03 0.63  0.63  0.01 0.40  0.40
Crit Volume:  300                         110       1090          10
Crit Moves:  ****                        ****       ****        ****
********************************************************************************
```

```
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
                  CCTALOS Method (Base Volume Alternative)
********************************************************************************
Intersection #10
********************************************************************************
Cycle (sec):         100               Critical Vol./Cap.(X):        0.655
Loss Time (sec):       0 (Y+R=4.0 sec) Average Delay (sec/veh):     xxxxxx
Optimal Cycle:        54               Level Of Service:                 B
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Protected        Protected        Protected
Rights:          Include          Include          Include          Include
Min. Green:    0    0     0    0    0     0    0    0     0    0    0     0
Lanes:        0  1  0  0  1    1  0  0  1  0    1  0  1  1  0    1  0  1  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      10   80    10   170   90    30   110 1590    10    20 1330    70
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   10   80    10   170   90    30   110 1590    10    20 1330    70
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:    10   80    10   170   90    30   110 1590    10    20 1330    70
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   10   80    10   170   90    30   110 1590    10    20 1330    70
RTOR Reduct:    0    0    10     0    0     0     0    0     0     0    0     0
RTOR Vol:      10   80     0   170   90    30   110 1590    10    20 1330    70
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:   10   80     0   170   90    30   110 1590    10    20 1330    70
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1650 1650  1650  1650 1650  1650  1650 1650  1650  1650 1650  1650
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.11 0.89  1.00  1.00 0.75  0.25  1.00 1.99  0.01  1.00 1.90  0.10
Final Sat.:   183 1467  1650  1650 1238   413  1650 3279    21  1650 3135   165
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.05 0.05  0.00  0.10 0.07  0.07  0.07 0.48  0.48  0.01 0.42  0.42
Crit Volume:        90         170                             800    20
Crit Moves:        ****        ****                            ****  ****
********************************************************************************
```

Level Of Service Computation Report
CCTALOS Method (Base Volume Alternative)

Intersection #11

Cycle (sec):	100	Critical Vol./Cap.(X):	0.666
Loss Time (sec):	0 (Y+R=4.0 sec)	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	56	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	0 1	0	1 0	0 1	0	1 0	2 0	1	1 0	1 1	0
Volume Module:												
Base Vol:	170	10	10	20	10	20	30	1670	100	110	1270	20
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	170	10	10	20	10	20	30	1670	100	110	1270	20
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	170	10	10	20	10	20	30	1670	100	110	1270	20
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	170	10	10	20	10	20	30	1670	100	110	1270	20
RTOR Reduct:	0	0	0	0	0	0	0	0	100	0	0	0
RTOR Vol:	170	10	10	20	10	20	30	1670	0	110	1270	20
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	170	10	10	20	10	20	30	1670	0	110	1270	20
Saturation Flow Module:												
Sat/Lane:	1720	1720	1720	1720	1720	1720	1720	1720	1720	1720	1720	1720
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.50	0.50	1.00	0.33	0.67	1.00	2.00	1.00	1.00	1.97	0.03
Final Sat.:	1720	860	860	1720	573	1147	1720	3440	1720	1720	3387	53
Capacity Analysis Module:												
Vol/Sat:	0.10	0.01	0.01	0.01	0.02	0.02	0.02	0.49	0.00	0.06	0.37	0.38
Crit Volume:	170				30			835		110		
Crit Moves:	****				****			****		****		

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--------------------------------------------------------------------------------
                     Level Of Service Computation Report
                  CCTALOS Method (Base Volume Alternative)
********************************************************************************
Intersection #12
********************************************************************************
Cycle (sec):          100                Critical Vol./Cap.(X):         0.725
Loss Time (sec):        0 (Y+R=4.0 sec)  Average Delay (sec/veh):      xxxxxx
Optimal Cycle:         52                Level Of Service:                  C
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Permitted        Permitted        Permitted        Permitted
Rights:          Include          Include          Include          Include
Min. Green:     0    0     0     0    0     0     0    0     0     0    0     0
Lanes:        1  0  0  0  1    0  0  0  0  0    0  0  2  0  1    1  0  2  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      30    0   490     0    0     0     0 1630    50   290 1370     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   30    0   490     0    0     0     0 1630    50   290 1370     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:    30    0   490     0    0     0     0 1630    50   290 1370     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:   30    0   490     0    0     0     0 1630    50   290 1370     0
RTOR Reduct:    0    0   290     0    0     0     0    0    30     0    0     0
RTOR Vol:      30    0   200     0    0     0     0 1630    20   290 1370     0
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:   30    0   200     0    0     0     0 1630    20   290 1370     0
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1800 1800  1800  1800 1800  1800  1800 1800  1800  1800 1800  1800
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       1.00 0.00  1.00  0.00 0.00  0.00  0.00 2.00  1.00  1.00 2.00  0.00
Final Sat.:  1800    0  1800     0    0     0     0 3600  1800  1800 3600     0
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.02 0.00  0.11  0.00 0.00  0.00  0.00 0.45  0.01  0.16 0.38  0.00
Crit Volume:             200     0                   815         290
Crit Moves:             ****                        ****        ****
********************************************************************************
```

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--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
                     Level Of Service Computation Report
                  CCTALOS Method (Base Volume Alternative)
********************************************************************************
Intersection #5
********************************************************************************
Cycle (sec):         100                 Critical Vol./Cap.(X):        0.832
Loss Time (sec):       0 (Y+R=4.0 sec)  Average Delay (sec/veh):      xxxxxx
Optimal Cycle:       111                 Level Of Service:                 D
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|----------------||----------------||----------------||----------------|
Control:       Split Phase      Split Phase        Permitted        Permitted
Rights:          Include          Include           Include          Include
Min. Green:     0    0     0     0    0     0     0    0     0     0    0     0
Lanes:        1  0  0  1  0    2  0  0  1  0    0  1  0  1  0    1  0  1  0  2
------------|----------------||----------------||----------------||----------------|
Volume Module:
Base Vol:     100  110    30  1630   40    10    10  460   200    60  230  1370
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  100  110    30  1630   40    10    10  460   200    60  230  1370
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:   100  110    30  1630   40    10    10  460   200    60  230  1370
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:  100  110    30  1630   40    10    10  460   200    60  230  1370
RTOR Reduct:    0    0     0     0    0     0     0    0     0     0    0   897
RTOR Vol:     100  110    30  1630   40    10    10  460   200    60  230   474
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:  100  110    30  1630   40    10    10  460   200    60  230   474
------------|----------------||----------------||----------------||----------------|
Saturation Flow Module:
Sat/Lane:    1720 1720  1720  1720 1720  1720  1720 1720  1720  1720 1720  1720
Adjustment:  1.00 1.00  1.00  0.91 1.00  1.00  1.00 1.00  1.00  1.00 1.00  0.91
Lanes:       1.00 0.79  0.21  2.00 0.80  0.20  0.03 1.37  0.60  1.00 1.00  2.00
Final Sat.:  1720 1351   369  3127 1376   344    51 2362  1027  1720 1720  3127
------------|----------------||----------------||----------------||----------------|
Capacity Analysis Module:
Vol/Sat:     0.06 0.08  0.08  0.52 0.03  0.03  0.19 0.19  0.19  0.03 0.13  0.15
Crit Volume:       140         815                     335         60
Crit Moves:        ****        ****                    ****        ****
********************************************************************************
```

SIDRA ANALYSIS

SIDRA INTERSECTION

Output Tables

Main St/Old Main St/O'Hara Ave - Alternative 2

Cumulative WP AM

Run Information

Table S.14 - Summary of Input and Output Data

```
Main St/Old Main St/O'Hara Ave - Alternative 2
Cumulative WP AM
Intersection ID: 5
Roundabout

--------------------------------------------------------------------------
 Lane   Demand Flow (veh/h)       Adj.  Eff Grn   Deg   Aver. Longest Shrt
 No.   --------------------  %HV  Basic  (secs)   Sat   Delay  Queue  Lane
          L    T    R   Tot       Satf. 1st 2nd    x    (sec)   (ft)  (ft)
--------------------------------------------------------------------------
 SouthWest: Old Main St
1 LR     11        527   538    2                0.890   20.8    343  1600
        ------------------------------------------------------------------
         11    0  527   538    2                0.890   20.8    343
--------------------------------------------------------------------------
 South: O'Hara Ave
1 LR    190         42   232    2                0.515   17.1    101  1600
        ------------------------------------------------------------------
        190    0   42   232    2                0.515   17.1    101
--------------------------------------------------------------------------
 SouthEast: Main Street SR4
1 LT    210  704         914    4                0.818   11.9    417  1600
2 T          980         980    5                0.818   10.2    416  1600
        ------------------------------------------------------------------
        210 1684    0  1894    5                0.818   11.0    417
--------------------------------------------------------------------------
 NorthWest: Main Street SR4
1 T          274         274    5                0.289    8.0     61  1600
2 TR         242   42    284    5                0.289    8.0     61  1600
        ------------------------------------------------------------------
          0  516   42   558    5                0.289    8.0     61
==========================================================================
 ALL VEHICLES          Total   %                  Max   Aver.   Max
                       Flow   HV                   X    Delay  Queue
                       3222    4                0.917   12.6    417
==========================================================================
Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (feet).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-
      controlled intersections and apply only to continuous lanes.
```

Table S.15 - Capacity and Level of Service

Main St/Old Main St/O'Hara Ave - Alternative 2
Cumulative WP AM
Intersection ID: 5
Roundabout

Mov ID	Mov Typ	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest Queue 95% Back (vehs)	Longest Queue 95% Back (ft)
SouthWest: Old Main St								
13L	L	11	12	0.917*	26.5	C	13.5	343
18R	R	527	592	0.890	20.7	C	13.5	343
South: O'Hara Ave								
3L	L	190	369	0.515	17.8	B	4.0	101
8R	R	42	82	0.512	14.0	B	4.0	101
SouthEast: Main Street SR4								
11L	L	210	257	0.817	15.2	B	16.1	417
16T	T	1684	2058	0.818	10.5	B	16.1	417
NorthWest: Main Street SR4								
12T	T	516	1786	0.289	7.9	A	2.4	61
12R	R	42	145	0.290	8.5	A	2.4	61
ALL VEHICLES:		3222		0.917	12.6	B	16.1	417

Level of Service calculations are based on average control delay including geometric delay (HCM criteria), independent of the current delay definition used.
For the criteria, refer to the "Level of Service" topic in the SIDRA Output Guide or the Output section of the on-line help.

* Maximum v/c ratio, or critical green periods

" Movement Level of service has been determined using adjacent lane v/c ratio rather than short lane v/c ratio (v/c=1.0)

SIDRA SOLUTIONS

Site: Cumulative WP AM Alternative 2
N:\PROJECTS_WC06\WC06-2337 Downtown Oakley\Analysis\SIDRA\Alternative 2 Intersection 5.aap
Processed Jul 06, 2009 04:27:00PM

A1128, Fehr & Peers, Large Office
Produced by SIDRA Intersection 3.2.2.1563

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Output Tables

Main St/Old Main St/O'Hara Ave - Alternative 2

Cumulative WP PM

Run Information

Table S.14 - Summary of Input and Output Data

Main St/Old Main St/O'Hara Ave - Alternative 2
Cumulative WP PM
Intersection ID: 5
Roundabout

Lane No.	Demand Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st	2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (ft)	Shrt Lane (ft)
SouthWest: Old Main St												
1 LR	11		695	706	2				3.568	1177.4	4518	1600
	11	0	695	706	2				3.568	1177.4	4518	
South: O'Hara Ave												
1 LR	221		32	253	2				1.284	170.1	703	1600
	221	0	32	253	2				1.284	170.1	703	
SouthEast: Main Street SR4												
1 LT	305	539		844	4				0.740	9.8	297	1600
2 T		903		903	5				0.740	7.8	296	1600
	305	1442	0	1747	4				0.740	8.8	297	
NorthWest: Main Street SR4												
1 T		853		853	5				0.942	26.6	701	1600
2 TR		863	53	916	5				0.942	25.3	718	1600
	0	1716	53	1769	5				0.942	26.0	718	

ALL VEHICLES	Total Flow	% HV	Max X	Aver. Delay	Max Queue
	4475	4	3.667	209.1	4518

Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (feet).

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

Table S.15 - Capacity and Level of Service

Main St/Old Main St/O'Hara Ave - Alternative 2
Cumulative WP PM
Intersection ID: 5
Roundabout

Mov ID	Mov Typ	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest Queue 95% Back (vehs)	(ft)
SouthWest: Old Main St								
13L	L	11	3	3.667*	1183.2	F	177.7	4518
18R	R	695	195	3.564	1177.3	F	177.7	4518
South: O'Hara Ave								
3L	L	221	172	1.285	170.7	F	27.7	703
8R	R	32	25	1.280	166.7	F	27.7	703
SouthEast: Main Street SR4								
11L	L	305	412	0.740	12.5	B	11.5	297
16T	T	1442	1948	0.740	8.0	A	11.5	297
NorthWest: Main Street SR4								
12T	T	1716	1821	0.942	26.0	C	27.6	718
12R	R	53	56	0.946	25.5	C	27.6	718
ALL VEHICLES:		4475		3.667	209.1	F	177.7	4518

Level of Service calculations are based on
average control delay including geometric delay (HCM criteria),
independent of the current delay definition used.
For the criteria, refer to the "Level of Service" topic in the
SIDRA Output Guide or the Output section of the on-line help.
* Maximum v/c ratio, or critical green periods
" Movement Level of service has been determined using adjacent lane
v/c ratio rather than short lane v/c ratio (v/c=1.0)

SIDRA SOLUTIONS

Site: Cumulative WP PM Alternative 2
N:\PROJECTS_WC06\WC06-2337 Downtown Oakley\Analysis\SIDRA\Alternative 2 Intersection 5.aap
Processed Jul 06, 2009 04:28:05PM

A1128, Fehr & Peers, Large Office
Produced by SIDRA Intersection 3.2.2.1563

MITIGATIONS

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	
Frpb, ped/bikes	1.00	1.00	0.98		1.00	0.99	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	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	0.85	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	1554		1804	1560	1770	3520		1770	3355	
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	1554		1804	1560	1770	3520		1770	3355	
Volume (vph)	140	10	240	20	10	20	410	620	20	50	420	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)	147	11	253	21	11	21	432	653	21	53	442	189
RTOR Reduction (vph)	0	0	230	0	0	19	0	2	0	0	44	0
Lane Group Flow (vph)	77	81	23	0	32	2	432	672	0	53	587	0
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
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)	8.2	8.2	8.2		6.7	6.7	26.3	44.9		11.2	29.8	
Effective Green, g (s)	8.2	8.2	8.2		7.7	7.7	27.3	45.9		12.2	30.8	
Actuated g/C Ratio	0.09	0.09	0.09		0.09	0.09	0.30	0.51		0.14	0.34	
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)	153	155	142		154	133	537	1795		240	1148	
v/s Ratio Prot	0.05	c0.05			c0.02		c0.24	0.19		0.03	c0.17	
v/s Ratio Perm			0.01			0.00						
v/c Ratio	0.50	0.52	0.16		0.21	0.01	0.80	0.37		0.22	0.51	
Uniform Delay, d1	39.0	39.0	37.7		38.3	37.7	28.9	13.4		34.7	23.6	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		0.68	0.45	
Incremental Delay, d2	2.6	3.2	0.5		0.7	0.0	8.5	0.6		0.4	1.4	
Delay (s)	41.6	42.2	38.3		39.0	37.7	37.4	14.0		23.9	12.1	
Level of Service	D	D	D		D	D	D	B		C	B	
Approach Delay (s)		39.7			38.5			23.1			13.0	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM Average Control Delay	23.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	61.1%	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		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
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00	0.99		1.00	0.98
Flpb, ped/bikes	1.00	1.00	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	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)	1770	3438	1561	3433	3430		3433	1863	1561		1837	1550
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)	1770	3438	1561	3433	3430		3433	1863	1561		1837	1550
Volume (vph)	20	850	280	320	1250	20	550	30	200	20	50	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	895	295	337	1316	21	579	32	211	21	53	63
RTOR Reduction (vph)	0	0	194	0	1	0	0	0	157	0	0	59
Lane Group Flow (vph)	21	895	101	337	1336	0	579	32	54	0	74	4
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	2%	5%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
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)	1.6	29.8	29.8	13.2	41.4		22.0	22.0	22.0		6.0	6.0
Effective Green, g (s)	2.6	30.8	30.8	14.2	42.4		23.0	23.0	23.0		6.0	6.0
Actuated g/C Ratio	0.03	0.34	0.34	0.16	0.47		0.26	0.26	0.26		0.07	0.07
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)	51	1177	534	542	1616		877	476	399		122	103
v/s Ratio Prot	0.01	0.26		c0.10	c0.39		c0.17	0.02			c0.04	
v/s Ratio Perm			0.06						0.03			0.00
v/c Ratio	0.41	0.76	0.19	0.62	0.83		0.66	0.07	0.14		0.61	0.04
Uniform Delay, d1	42.9	26.3	20.8	35.4	20.6		30.0	25.4	25.8		40.9	39.3
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.72	0.76	1.01		1.00	1.00
Incremental Delay, d2	5.3	2.9	0.2	2.2	3.6		3.7	0.3	0.7		8.3	0.2
Delay (s)	48.3	29.3	21.0	37.6	24.2		25.2	19.5	26.7		49.1	39.5
Level of Service	D	C	C	D	C		C	B	C		D	D
Approach Delay (s)		27.6			26.9			25.4			44.7	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM Average Control Delay	27.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	70.9%	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	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	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		1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1767	1840		1770	1854		1768	1790		1767	1824	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1767	1840		1770	1854		1768	1790		1767	1824	
Volume (vph)	10	260	20	50	360	10	20	240	70	10	210	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	274	21	53	379	11	21	253	74	11	221	32
RTOR Reduction (vph)	0	3	0	0	1	0	0	16	0	0	7	0
Lane Group Flow (vph)	11	292	0	53	389	0	21	311	0	11	246	0
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	0.5	17.5		2.3	19.3		0.8	10.3		0.5	10.0	
Effective Green, g (s)	0.5	17.5		2.3	19.3		0.8	10.3		0.5	10.0	
Actuated g/C Ratio	0.01	0.38		0.05	0.41		0.02	0.22		0.01	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)	19	691		87	768		30	396		19	391	
v/s Ratio Prot	0.01	0.16		c0.03	c0.21		c0.01	c0.17		0.01	0.13	
v/s Ratio Perm												
v/c Ratio	0.58	0.42		0.61	0.51		0.70	0.79		0.58	0.63	
Uniform Delay, d1	22.9	10.8		21.7	10.1		22.8	17.1		22.9	16.6	
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		11.5	0.5		52.7	9.9		36.3	3.2	
Delay (s)	59.2	11.2		33.2	10.6		75.5	27.0		59.2	19.8	
Level of Service	E	B		C	B		E	C		E	B	
Approach Delay (s)		12.9			13.3			29.9			21.4	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM Average Control Delay	19.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	46.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.8%	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	4.0	
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00		1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	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	0.85	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	1711	1576		1807	1558	1770	3517		1770	3427	
Flt Permitted	0.95	0.97	1.00		0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1681	1711	1576		1807	1558	1770	3517		1770	3427	
Volume (vph)	310	60	410	80	50	80	390	810	30	150	730	160
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)	326	63	432	84	53	84	411	853	32	158	768	168
RTOR Reduction (vph)	0	0	150	0	0	73	0	3	0	0	14	0
Lane Group Flow (vph)	189	200	282	0	137	11	411	882	0	158	922	0
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
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)	17.6	17.6	49.3		14.1	14.1	31.7	42.4		26.9	37.6	
Effective Green, g (s)	17.6	17.6	50.3		15.1	15.1	32.7	43.4		27.9	38.6	
Actuated g/C Ratio	0.15	0.15	0.42		0.13	0.13	0.27	0.36		0.23	0.32	
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)	247	251	661		227	196	482	1272		412	1102	
v/s Ratio Prot	0.11	c0.12	0.12		c0.08		c0.23	0.25		0.09	c0.27	
v/s Ratio Perm			0.06			0.01						
v/c Ratio	0.77	0.80	0.43		0.60	0.05	0.85	0.69		0.38	0.84	
Uniform Delay, d1	49.2	49.5	24.7		49.6	46.2	41.4	32.6		38.8	37.8	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		0.76	0.72	
Incremental Delay, d2	13.2	15.9	0.4		4.5	0.1	13.6	3.1		0.4	5.5	
Delay (s)	62.4	65.4	25.1		54.1	46.3	55.0	35.8		29.9	32.8	
Level of Service	E	E	C		D	D	D	D		C	C	
Approach Delay (s)		43.5			51.1			41.9			32.3	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	39.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
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		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
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00	0.99		1.00	0.98
Flpb, ped/bikes	1.00	1.00	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	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)	1770	3438	1566	3433	3426		3433	1863	1569		1811	1544
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)	1770	3438	1566	3433	3426		3433	1863	1569		1811	1544
Volume (vph)	40	1690	610	400	1220	30	650	60	490	40	30	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	1779	642	421	1284	32	684	63	516	42	32	32
RTOR Reduction (vph)	0	0	70	0	1	0	0	0	33	0	0	31
Lane Group Flow (vph)	42	1779	572	421	1315	0	684	63	483	0	74	1
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Heavy Vehicles (%)	2%	5%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
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)	6.6	59.2	80.4	15.0	67.6		21.2	21.2	36.2		5.6	5.6
Effective Green, g (s)	7.6	60.2	82.4	16.0	68.6		22.2	22.2	38.2		5.6	5.6
Actuated g/C Ratio	0.06	0.50	0.69	0.13	0.57		0.18	0.18	0.32		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)	112	1725	1128	458	1959		635	345	499		85	72
v/s Ratio Prot	0.02	c0.52	0.09	0.12	0.38		c0.20	0.03	c0.13		c0.04	
v/s Ratio Perm			0.27						0.18			0.00
v/c Ratio	0.38	1.03	0.51	0.92	0.67		1.08	0.18	0.97		0.87	0.02
Uniform Delay, d1	53.9	29.9	9.0	51.4	17.9		48.9	41.2	40.3		56.8	54.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.62	0.59	1.06		1.00	1.00
Incremental Delay, d2	2.1	30.1	0.4	23.3	0.9		54.2	0.9	27.0		57.0	0.1
Delay (s)	56.0	60.0	9.4	74.7	18.8		84.4	25.3	69.7		113.9	54.7
Level of Service	E	E	A	E	B		F	C	E		F	D
Approach Delay (s)		46.8			32.3			75.5			96.0	
Approach LOS		D			C			E			F	

Intersection Summary			
HCM Average Control Delay	49.7	HCM Level of Service	D
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	93.3%	ICU Level of Service	F
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		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	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		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	1847		1770	1856		1770	1791		1770	1852	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1847		1770	1856		1770	1791		1770	1852	
Volume (vph)	60	590	30	100	530	10	30	280	80	20	300	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)	63	621	32	105	558	11	32	295	84	21	316	11
RTOR Reduction (vph)	0	2	0	0	1	0	0	13	0	0	1	0
Lane Group Flow (vph)	63	651	0	105	568	0	32	366	0	21	326	0
Confl. Peds. (#/hr)	2		2	2		2	2		2	2		2
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	2.9	25.4		4.3	26.8		1.3	16.2		1.3	16.2	
Effective Green, g (s)	2.9	25.4		4.3	26.8		1.3	16.2		1.3	16.2	
Actuated g/C Ratio	0.05	0.40		0.07	0.42		0.02	0.26		0.02	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)	81	742		120	787		36	459		36	475	
v/s Ratio Prot	0.04	c0.35		c0.06	0.31		c0.02	c0.20		0.01	0.18	
v/s Ratio Perm												
v/c Ratio	0.78	0.88		0.88	0.72		0.89	0.80		0.58	0.69	
Uniform Delay, d1	29.8	17.5		29.2	15.1		30.9	22.0		30.7	21.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	36.4	11.4		45.8	3.3		104.6	9.3		21.8	4.1	
Delay (s)	66.2	28.8		75.0	18.4		135.4	31.2		52.5	25.3	
Level of Service	E	C		E	B		F	C		D	C	
Approach Delay (s)		32.1			27.2			39.4			26.9	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM Average Control Delay	31.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	63.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
  ==========================================================================
  Condition: Cumulative WP Mitigated AM                             04/03/07
  ==========================================================================
  INTERSECTION     1 Empire Ave/Oakley Road           Oakley
  Count Date                   Time                 Peak Hour AM
  --------------------------------------------------------------------------
  CCTA METHOD         RIGHT THRU LEFT                          6-PHASE SIGNAL
  -----------           180  420   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 Road

  RIGHT  240 ---  1.0   1.0  2.1  1.1   1.1 ---   20  LEFT
               |       <---    ^   --->       |
               v          |    |    |         v
    N                     |    |    |                      SIG WARRANTS:
  W + E                 410  620   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)      620        620       3300     0.1879
      LEFT (L)      410        410       1650     0.2485     0.2485
      T + R                    640       3300     0.1939
  --------------------------------------------------------------------------
  SB  RIGHT (R)     180        180       1650     0.1091
      THRU (T)      420        420       3300     0.1273
      LEFT (L)       50         50       1650     0.0303
      T + R                    600       3300     0.1818     0.1818
  --------------------------------------------------------------------------
  EB  RIGHT (R)     240          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:                           0.50
       INTERSECTION LEVEL OF SERVICE:                               A
  ==========================================================================
  * ADJUSTED FOR RIGHT TURN ON RED
  INT=CUMWPMIT.INT,VOL=CUMWPMIT.AM,CAP=
```

```
=========================================================================
Condition: Cumulative WP Mitigated AM                            04/03/07
=========================================================================
INTERSECTION     2 Empire Avenue/Main Street         Oakley
Count Date                   Time                Peak Hour AM
-------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                            6-PHASE SIGNAL
-----------            60   50   20
                        |    |    |
             ^          |    |    |         ^
             |       <---    v    --->      | Split? N
LEFT    20 ---  1.0   1.0  1.1  1.1   1.1 ---   20  RIGHT
                                                          STREET NAME:
THRU   850 ---> 2.0  (NO. OF LANES)   2.1<--- 1250  THRU  Main Street

RIGHT  280 ---  1.0   2.0  1.0  1.0   2.0 ---  320  LEFT
             |       <---    ^    --->      |
             v          |    |    |         v
  N                     |    |    |                       SIG WARRANTS:
W + E                 550   30  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          24 *     1650     0.0145
    THRU (T)       30          30       1650     0.0182
    LEFT (L)      550         550       3000     0.1833     0.1833
-------------------------------------------------------------------------
SB  RIGHT (R)      60          40 *     1650     0.0242
    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)     280           0 *     1650     0.0000
    THRU (T)      850         850       3300     0.2576
    LEFT (L)       20          20       1650     0.0121     0.0121
-------------------------------------------------------------------------
WB  RIGHT (R)      20          20       1650     0.0121
    THRU (T)     1250        1250       3300     0.3788
    LEFT (L)      320         320       3000     0.1067
    T + R                    1270       3300     0.3848     0.3848
=========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                              0.62
     INTERSECTION LEVEL OF SERVICE:                                  B
=========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=CUMWPMIT.INT,VOL=CUMWPMIT.AM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
========================================================================
Condition: Cumulative WP Mitigated AM                           04/03/07
========================================================================
INTERSECTION    11 O'Hara Ave/Cypress               Oakley
Count Date                   Time              Peak Hour PM
------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            30  210   10
                        |   |    |
             ^          |   |    |         ^
             |       <---   v   --->       | Split? N
LEFT    10 ---  1.0   1.1  1.1  1.0   1.1 ---   10  RIGHT
                                                          STREET NAME:
THRU   260 ---> 1.1  (NO. OF LANES)   1.1<---  360  THRU  Cypress

RIGHT   20 ---  1.1   1.0  1.1  1.1   1.0 ---   50  LEFT
             |       <---   ^   --->       |
             v          |   |    |         v
  N                     |   |    |                        SIG WARRANTS:
W + E                  20  240   70                         Urb=N, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: O'Hara Ave
========================================================================
               ORIGINAL   ADJUSTED                 V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*   CAPACITY    RATIO       V/C
------------------------------------------------------------------------
NB  RIGHT (R)      70         70        1650     0.0424
    THRU (T)      240        240        1650     0.1455
    LEFT (L)       20         20        1650     0.0121
    T + R                    310        1650     0.1879     0.1879
------------------------------------------------------------------------
SB  RIGHT (R)      30         30        1650     0.0182
    THRU (T)      210        210        1650     0.1273
    LEFT (L)       10         10        1650     0.0061     0.0061
    T + R                    240        1650     0.1455
------------------------------------------------------------------------
EB  RIGHT (R)      20         20        1650     0.0121
    THRU (T)      260        260        1650     0.1576
    LEFT (L)       10         10        1650     0.0061     0.0061
    T + R                    280        1650     0.1697
------------------------------------------------------------------------
WB  RIGHT (R)      10         10        1650     0.0061
    THRU (T)      360        360        1650     0.2182
    LEFT (L)       50         50        1650     0.0303
    T + R                    370        1650     0.2242     0.2242
========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                           0.42
     INTERSECTION LEVEL OF SERVICE:                               A
========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=CUMWPMIT.INT,VOL=CUMWPMIT.AM,CAP=
```

```
==========================================================================
Condition: Cumulative WP Mitigated PM                             04/03/07
==========================================================================
INTERSECTION     1 Empire Ave/Oakley Road           Oakley
Count Date                   Time               Peak Hour PM
--------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                           6-PHASE SIGNAL
-----------           160  730  150
                        |    |    |
             ^          |    |    |         ^
             |       <---    v    --->      | Split? Y
LEFT   310 ---  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 Road

RIGHT  410 ---  1.0   1.0  2.1  1.1   1.1 ---   80  LEFT
             |       <---    ^    --->      |
             v          |    |    |         v
  N                     |    |    |                       SIG WARRANTS:
W + E                 390  810   30                         Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: Empire Ave
==========================================================================
```

	MOVEMENT	ORIGINAL VOLUME	ADJUSTED VOLUME*	CAPACITY	V/C RATIO	CRITICAL V/C
NB	RIGHT (R)	30	30	1650	0.0182	
	THRU (T)	810	810	3300	0.2455	
	LEFT (L)	390	390	1650	0.2364	0.2364
	T + R		840	3300	0.2545	
SB	RIGHT (R)	160	160	1650	0.0970	
	THRU (T)	730	730	3300	0.2212	
	LEFT (L)	150	150	1650	0.0909	
	T + R		890	3300	0.2697	0.2697
EB	RIGHT (R)	410	20 *	1650	0.0121	
	THRU (T)	60	60	1650	0.0364	
	LEFT (L)	310	310	3000	0.1033	
	T + L		370	3000	0.1233	0.1233
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:                             0.71
     INTERSECTION LEVEL OF SERVICE:                                 C
==========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=CUMWPMIT.INT,VOL=CUMWPMIT.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
=========================================================================
Condition: Cumulative WP Mitigated PM                            04/03/07
=========================================================================
INTERSECTION     2 Empire Avenue/Main Street         Oakley
Count Date                   Time               Peak Hour PM
-------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                        6-PHASE SIGNAL
-----------            30   30   40
                        |    |    |
             ^          |    |    |         ^
             |       <---    v    --->      | Split? N
LEFT    40 ---  1.0   1.0  1.1  1.1   1.1 ---   30  RIGHT
                                                           STREET NAME:
THRU  1690 ---> 2.0  (NO. OF LANES)   2.1<--- 1220  THRU   Main Street

RIGHT  610 ---  1.0   2.0  1.0  1.0   2.0 ---  400  LEFT
             |       <---    ^    --->      |
             v          |    |    |         v
  N                     |    |    |                        SIG WARRANTS:
W + E                 650   60  490                          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)     490        270 *     1650     0.1636
    THRU (T)       60         60       1650     0.0364
    LEFT (L)      650        650       3000     0.2167     0.2167
-------------------------------------------------------------------------
SB  RIGHT (R)      30          0 *     1650     0.0000
    THRU (T)       30         30       1650     0.0182
    LEFT (L)       40         40       1650     0.0242
    T + L                     70       1650     0.0424     0.0424
-------------------------------------------------------------------------
EB  RIGHT (R)     610        253 *     1650     0.1533
    THRU (T)     1690       1690       3300     0.5121     0.5121
    LEFT (L)       40         40       1650     0.0242
-------------------------------------------------------------------------
WB  RIGHT (R)      30         30       1650     0.0182
    THRU (T)     1220       1220       3300     0.3697
    LEFT (L)      400        400       3000     0.1333     0.1333
    T + R                   1250       3300     0.3788
=========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                         0.90
     INTERSECTION LEVEL OF SERVICE:                             D
=========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=CUMWPMIT.INT,VOL=CUMWPMIT.PM,CAP=
```

```
CCTALOS Software ver. 2.35 by TJKM Transportation Consultants
=========================================================================
Condition: Cumulative WP Mitigated PM                           04/03/07
=========================================================================
INTERSECTION    11 O'Hara Ave/Cypress               Oakley
Count Date                   Time             Peak Hour PM
-------------------------------------------------------------------------
CCTA METHOD         RIGHT THRU LEFT                       8-PHASE SIGNAL
-----------            10  300   20
                        |   |    |
             ^          |   |    |         ^
             |       <---   v   --->       | Split? N
LEFT    60 ---  1.0   1.1  1.1  1.0   1.1 ---   10  RIGHT
                                                      STREET NAME:
THRU   590 ---> 1.1  (NO. OF LANES)   1.1<---  530  THRU  Cypress

RIGHT   30 ---  1.1   1.0  1.1  1.1   1.0 ---  100  LEFT
             |       <---   ^   --->       |
             v          |   |    |         v
  N                     |   |    |                    SIG WARRANTS:
W + E                  30  280   80                     Urb=Y, Rur=Y
  S                  LEFT THRU RIGHT Split? N

               STREET NAME: O'Hara Ave
=========================================================================
               ORIGINAL   ADJUSTED                V/C     CRITICAL
   MOVEMENT     VOLUME     VOLUME*  CAPACITY    RATIO       V/C
-------------------------------------------------------------------------
NB  RIGHT (R)      80          80       1650     0.0485
    THRU (T)      280         280       1650     0.1697
    LEFT (L)       30          30       1650     0.0182
    T + R                     360       1650     0.2182     0.2182
-------------------------------------------------------------------------
SB  RIGHT (R)      10          10       1650     0.0061
    THRU (T)      300         300       1650     0.1818
    LEFT (L)       20          20       1650     0.0121     0.0121
    T + R                     310       1650     0.1879
-------------------------------------------------------------------------
EB  RIGHT (R)      30          30       1650     0.0182
    THRU (T)      590         590       1650     0.3576
    LEFT (L)       60          60       1650     0.0364
    T + R                     620       1650     0.3758     0.3758
-------------------------------------------------------------------------
WB  RIGHT (R)      10          10       1650     0.0061
    THRU (T)      530         530       1650     0.3212
    LEFT (L)      100         100       1650     0.0606     0.0606
    T + R                     540       1650     0.3273
=========================================================================
     TOTAL VOLUME-TO-CAPACITY RATIO:                            0.67
     INTERSECTION LEVEL OF SERVICE:                                B
=========================================================================
* ADJUSTED FOR RIGHT TURN ON RED
INT=CUMWPMIT.INT,VOL=CUMWPMIT.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. 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 validation results for the AM peak hour, while Table C-2 shows the validation results for the PM peak hour. The 2005 AM peak hour model satisfies three of the six CCTA peak hour validation criteria. It very nearly satisfies four of the criteria, missing the target for intersections within 15 percent of counts by one location. As shown in Table C-2, the 2005 PM peak hour model satisfies all six of the CCTA peak hour validation criteria. In comparison to the existing intersection counts, the 2005 AM peak hour model generally underestimates volumes by about 10 to 15 percent. The underestimation is across the study area and not in isolated areas. This pattern of underestimation in the AM peak hour has been observed in other model runs in the East County area, and may be at least partially due to the fact that East County residents commute relatively long distances, and thus may begin their morning commute trip earlier than the countywide average AM peak hour.

As recommended in the CCTA *Technical Procedures*, intersection turning movement forecasts will not be taken directly from the model but will be developed using a "Furness"-type process in which the model is used to estimate the amount of change expected over time. The underestimation of traffic volumes observed in the AM peak hour model, which leads to the failure to achieve three of the six validation targets, would likely continue to occur in the future year model scenarios, and thus would be accounted for in the "Furness" process. The 2005 model developed for this analysis is considered adequately validated and appropriate for use in developing future volume forecasts. Model parameters adjusted to achieve the 2005 model validation results will be included in the future scenarios to provide consistent results with the validated 2005 results.

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%	48	26	54%	75%	No
Arterials with 10,000+ Vehicles Within 15%	48	13	27%	50%	No
Intersections with 1,000+ veh/hr within 20% of Counts	16	9	56%	50%	Yes
Intersections with 500-1,000 veh/hr within 20% of Counts	8	5	63%	30%	Yes
All Intersections within 30% of Counts	25	19	76%	75%	Yes
All Intersections within 15% of Counts	25	12	48%	50%	No

Source: Fehr & Peers, 2007.

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%	48	41	85%	75%	Yes
Arterials with 10,000+ Vehicles Within 15%	48	29	60%	50%	Yes
Intersections with 1,000+ veh/hr within 20% of Counts	16	12	75%	50%	Yes
Intersections with 500-1,000 veh/hr within 20% of Counts	9	7	78%	30%	Yes
All Intersections within 30% of Counts	25	23	92%	75%	Yes
All Intersections within 15% of Counts	25	17	68%	50%	Yes

Source: Fehr & Peers, 2007.

APPENDIX D

AIR QUALITY DATA

Carbon Monoxide Calculation

Variable	Value	Source
C0 (1hr)	3.7	www.epa.gov/air/data 2005
C0 (8hr)	1.8	www.epa.gov/air/data 2005
Efi	3.07	*Table 10, BAAQMD CEQA Guidelines*

Intersection		Ref. Con. (Cri)	Traffic Vol. (Vi)	Emission Factor (Efi)	Concentraion (Ci)
Empire Avenue	Primary	14.0	2,330	3.07	1.0014
Oakly Road	Secondary	3.7	990	3.07	0.1125
Main Street	Primary	14.0	5,190	3.07	2.2307
Charles Way	Secondary	3.7	1,300	3.07	0.1477
Main Street	Primary	14.0	3,730	3.07	1.6032
Rose Avenue	Secondary	3.7	90	3.07	0.0102
Main Street	Primary	14.0	3,290	3.07	1.4140
W. Cypress Rd.	Secondary	3.7	2,260	3.07	0.2567
O'Hara Avenue	Primary	14.0	720	3.07	0.3095
W. Cypress Rd.	Secondary	3.7	1,320	3.07	0.1499
Main Street Bypass	Primary	14.0	1,360	3.07	0.5845
Main Street	Secondary	3.7	2,530	3.07	0.2874
Main Street Bypass	Primary	14.0	3,130	3.07	1.3453
Vintage Parkway	Secondary	3.7	380	3.07	0.0432
Main Street Bypass	Primary	14.0	3,020	3.07	1.2980
Norcross Lane	Secondary	3.7	200	3.07	0.0227

Future 2015

Intersection	Ci	Ci + C (1hr)	Ci + C (8hr)
1	1.1139	4.8139	2.9139
2	2.3783	6.0783	4.1783
3	1.6134	5.3134	3.4134
4	1.6708	5.3708	3.4708
5	0.4594	4.1594	2.2594
6	0.8719	4.5719	2.6719
7	1.3884	5.0884	3.1884
8	1.3207	5.0207	3.1207

APPENDIX E

GLOBAL CLIMATE CHANGE DATA

Greenhouse Gas Emissions Worksheet

Project Parameters		
	2020	
Vehicles (trips/day)	9,650	
Electricity used (MWh/year)	9,600	MWh = Megawatt hour
(mscf/year)	20.0	mscf = million standard cubic feet
Solid Waste (tonnes/year)	1,200	

Emission Source	Emissions (tonnes per year)				Percent of Total
	CO_2	CH_4	N_2O	CO_2eq	
Vehicles(1)	12,000	0.370	1.200	12,400	70
Electricity Production	2,700	0.029	0.016	2,700	15
Natural Gas Combustion	1,100	0.021	0.02	1,100	6
Solid Waste	--	--	--	1,400	8
Other Area Sources(2)		--	--		
Total Annual Emissions	16,000	0.420	1.200	17,600	100

Note: Numbers in table may not appear to add up correctly due to rounding of all numbers to two significant digits.

(1) CO_2 emissions for Vehicles from URBEMIS 2007 outputs, if available.

(2) Includes CO_2 emissions for hearth combustion and landscaping equipment from URBEMIS 2007 outputs.

Global Warming Potential

Gas	Atmospheric Lifetime (years)	Global Warming Potential (100 year time horizon)
Carbon Dioxide	50-200	1
Methane	12 ± 3	25
Nitrous Oxide	120	298
HFC-23	264	14800
HFC-134a	14.6	1430
HFC-152a	1.5	124
PFC: Tetrafluoromethane (CF_4)	50000	7390
PFC: Hexafluoromethane (C_2F_6)	10000	12200
Sulfur Hexafluoride (SF_6)	3200	22800

Electricity Emissions Worksheet

Commercial Electricity Usage (2003 data):

Commercial Building Type	Electricity Consumption per Building by Building Type (thousand kWH)	Electricity Consumption per Square Foot by Building Type (kWh)	Project Info (either # of bldgs or total sf, not both): # of bldgs	Project Info: total sf	Annual Electricity Consumption (MWh)
All Buildings	226	**14**			0
Mercantile	327	**17.8**			0
Enclosed and Strip Malls	718	**21.1**		360000	7,596
Retail (Other than Mall)	139	14.3			0
Education	283	**10.7**			0
Food Sales	276	49.4			0
Food Service	213	**31.8**			0
Health Care (All)	564	**20.1**			0
Inpatient Health	6,628	27.5			0
Outpatient Health	168	16.1			0
Lodging	483	**11.9**			0
Office	256	**14.6**			0
Other	510	22.5			0
Public Assembly	179	12.5			0
Public Order and Safety	237	15.3			0
Religious Worship	49	4.9			0
Service	73	**8**			0
Vacant	42	2.4			0
Warehouse and Storage	154	**5.9**			0

Note: Health Care (All) includes both "Inpatient Health" and "Outpatient Health".

Source: Energy Information Administration, www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/detailed_tables_2003.html, Table C14A - Bold valu

Residential Energy Usage (2001 data):

	Mountain	Pacific	Total US.	Project Info # of units	Annual Consumption MWh
Single Family	9,926	7,622	10,656		0
Apartments (2-4 Units)			7,176		0
Apartments (5 or more Units)			6,204	300	1,861
Mobile Home			12,469		0
Total Residential (kWh)					1,861

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-457 A-G of the 2001 Residential Energy Consumption Survey.

	CO_2			CH_4	N_2O
Electricity production emission factors for CA	lb/kWh 0.61	short tons/MWh 0.303	tons/MWh 0.275	lb/MWh 0.0067	lb/MWh 0.0037
U.S. Average	1.34	0.668	0.606	0.0111	0.0192

Source: Energy Information Administration, Updated State-and Regional-level Greenhouse Gas Emission Factors for Electricity (March 2002), http://www.eia.doe.gov/pub/oiaf/1605/cdrom/pdf/e-supdoc.pdf. (http://www.eia.doe.gov/oiaf/1605/ee-factors.html accessed 4/14/2008)

Water Usage Emissions Worksheet

Select the appropriate location:

	kWh/MG	
Project Location in California	◉ Northern	○ Southern
Water Supply and Conveyance	150	8,900
Water Treatment	100	100
Water Distribution	1,200	1,200
Wastewater Treatment	2,500	2,500
Totals	3,950	12,700

From California's Water Energy Relationship, CEC 2005

325,900 gallons/acre-feet

Project total usage 81.0 acre-feet/year

Water Supply and Conveyance	3,957.99	kWh/year
Water Treatment	2,638.66	kWh/year
Water Distribution	31,663.90	kWh/year
Wastewater Treatment	65,966.45	kWh/year
Total	104,226.99	kWh/year

Water usage calculator

Number of Residences		Total Gallons Per Day[1]	72,292
Estimated people per residence(1)		Gallons Per Year	26,386,580
Gallons/Resident/Day(2)	100	Total Acre-feet Per Year	80.97
Total Gallons Per Day	0		
Gallons Per Year	0		
Acre-feet Per Year	0		

(1) Based on an estimated waste generation rates of 200 gpd per dwelling unit and 1,050 gallons per acre per day (gpad) for commercial uses. Waste generation rates from the Ironhouse Sanitary District. Assumes wastewater flow is approximately 95 percent of water demand.

Total Square Footage	
Gallons/Square Foot/Year(3)	
Gallons Per Year	0
Acre-feet Per Year	0.0

Natural Gas Emissions Worksheet

Commercial Natural Gas Usage (2003 data):

Commercial Building Type	Natural Gas Consumption per Building by Building Type (thousand cf)	Natural Gas Consumption per Square Foot by Building Type (cf)	Project Info (enter values on Electricity worksheet) # of bldgs	Project Info total sf	Annual Natural Gas Consumption (thousand cf)
All Buildings	782	**29.2**	0	0	0
Mercantile	653	**19.7**	0	0	0
Enclosed and Strip Malls	1142	33.4	0	360000	12,024
Retail (Other than Mall)	362	**11.4**	0	0	0
Education	1223	**34.8**	0	0	0
Food Sales	383	50.2	0	0	0
Food Service	870	141.2	0	0	0
Health Care (All)	3283	**68.7**	0	0	0
Inpatient Health	28,222	109.8	0	0	0
Outpatient Health	574	50.2	0	0	0
Lodging	2432	**31.5**	0	0	0
Office	535	**14.2**	0	0	0
Other	1885	67.6	0	0	0
Public Assembly	678	36.4	0	0	0
Public Order and Safety	771	43.7	0	0	0
Religious Worship	362	30.3	0	0	0
Service	481	54.1	0	0	0
Vacant	557	23	0	0	0
Warehouse and Storage	687	23.4	0	0	0

Note: Health Care (All) includes both "Inpatient Health" and "Outpatient Health".

Source: Energy Information Administration, www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/detailed_tables_2003.html, Table C24A - Bold values

Residential Energy Usage (2001 data):

	Mountain	**Pacific**	**Total US.**	Project Info # of units	Annual Consumption thousand cf
Single Family	67	48	70	0	0
Apartments (2-4 Units)(1)		48		0	0
Apartments (5 or more Units)			28	300	8,400
Mobile Home			58	0	0
Total Natural Gas Usage					8,400

(1) Single family natural gas consumption was used to represent 2-4 Unit Apartments, as the total U.S. number (70 thousand cf) would exceed the Pacific region single-family home consumption rates. Single-family and 2-4 Unit Apartments have consistent total U.S. consumption rates, so it is reasonable that regional rates would be consistent as well.

Source: Table CE1-12c. Total Energy Consumption in U.S. Households by West Census Region, 2001 (http://www.eia.doe.gov/emeu/recs/recs2

	CO_2	**CH_4**	**N_2O**
Natural gas combustion	lb/10^6 scf	lb/10^6 scf	lb/10^6 scf
	120,000	2.3	2.2

Source: EPA AP-42 Vol I Chapter 1.4, Table 1.4-2

Solid Waste Emissions Worksheet

Total Square Footage - Office	
Disposal Rate (dry short tons/sq. ft./year)	0.0108
Office Waste (Dry Short Tons/Year)	0
Total Square Footage - Retail	360000
Disposal Rate (dry short tons/sq. ft./year)	0.0024
Retail Waste (Dry Short Tons/Year)	864
Total Residents	300
Disposal Rate (tons/unit/year)[2]	1.17
Residential Waste (Dry Short Tons/Year)	351
Total Waste (Dry Short Tons/Year)	1200
CO_2e Tonnes/Year	1400
Dry Short Tons/Wet Short Tons of MSW	0.84
MTCE/Wet Short Ton of MSW [4]	0.272
Tonnes of CO_2e/Wet Short Ton of MSW	1.007

(1) California Integrated Waste Management Board, 2009. Estimated Solid Waste Generation Rates for Commercial Establishments. Available at http://www.ciwmb.ca.gov/wastechar/wastegenrates/Commercial.htm.

(2) California Integrated Waste Management Board, 2009. Estimated Solid Waste Generation Rates for Residential Developments. Available at http://www.ciwmb.ca.gov/wastechar/WasteGenRates/Residential.htm

(3) U.S. Environmental Protection Agency. 2006. *Solid Waste Management and Greenhouse Gases: A Life-Cycle Assessment of Emissions and Sinks* , Exhibit 6-4. September.

(4) U.S. Environmental Protection Agency. 2006. *Solid Waste Management and Greenhouse Gases: A Life-Cycle Assessment of Emissions and Sinks* , Exhibit 6-6. September.

Vehicle Emissions Worksheet

avg. speed=	35	(mph)	avg trip length=	10	(miles)
2020		**CO_2**	**CH_4**	**N_2O**	**Fleet %**
LDA	CAT	303.519	0.009	0.032	69.6%
LDA	DSL	353.123	0.005	0.001	0.2%
LDT	CAT	384.357	0.014	0.042	27.0%
LDT	DSL	347.168	0.0035	0.002	0.4%
HDT	CAT	503.412	0.0384	0.088	1.2%
HDT	DSL	944.192	0.0074	0.005	1.6%
Composite		338.268	0.011	0.035	100.0%

Notes:

CO_2 and CH_4 from EMFAC2007

N_2O from EPA *Update of Methane and Nitrous Oxide Emission Factors for On-Highway Vehicles* , November 2004, Table 28.

Fleet percentages from URBEMIS2007

	From URBEMIS2007		
	Vehicle Categories	Fleet %	Diesel %
LDA	Light Auto	54	0
	Light Truck < 3750 lbs	12.6	1.6
LDT	Light Truck 3751-5750 lbs	19.9	0
	Med Truck 5751-8500 lbs	6.6	0
HDT	Lite-Heavy Truck 8501-10,000 lbs	0.9	22.2
	Lite-Heavy Truck 10,001-14,000 lbs	0.6	50
	Med-Heavy Truck 14,001-33,000 lbs	1	80
	Heavy-Heavy Truck 33,001-60,000 lbs	0.3	100
LDT	Other Bus	0.1	100
	Urban Bus	0.1	100
LDA	Motorcycle	3.2	0
LDT	School Bus	0.1	100
	Motor Home	0.6	16.7
		100	

APPENDIX F

NOISE DATA

TABLE Existing-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/01/2009
ROADWAY SEGMENT: Main Street - Empire Avenue to Miguel Drive
NOTES: Project Name - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 15500 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.59

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	70.0	143.6	306.0

TABLE Existing-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/01/2009
ROADWAY SEGMENT: Main Street - Miguel Drive to Vintage Parkway
NOTES: Project Name - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 15700 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.65

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	70.5	144.8	308.6

TABLE Existing-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/01/2009
ROADWAY SEGMENT: Main Street - Vintage Parkway to Norcross Lane
NOTES: Project Name - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 15800 SPEED (MPH): 30 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 63.99

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	53.4	112.8	241.9

TABLE Existing-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/01/2009
ROADWAY SEGMENT: Main Street - Norcross Lane to O'Hara Avenue
NOTES: Project Name - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 16000 SPEED (MPH): 30 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.04

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	53.9	113.7	243.9

TABLE Existing-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/01/2009
ROADWAY SEGMENT: Main Street - O'Hara Avenue to Roase Avenue
NOTES: Project Name - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 12800 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.68

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	59.2	125.4	269.1

TABLE Existing-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/01/2009
ROADWAY SEGMENT: Norcross Lane - South of Main Street
NOTES: Project Name - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 600 SPEED (MPH): 25 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 48.51

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE Existing-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/01/2009
ROADWAY SEGMENT: O'Hara Avenue - South of Main Street
NOTES: Project Name - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3500   SPEED (MPH): 25   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6   SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 56.17

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	66.8

TABLE Existing-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/01/2009
ROADWAY SEGMENT: Main Street Bypass - Main Street to Vintage Parkway
NOTES: Project Name - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 0   SPEED (MPH): 35   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24   SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 22.69

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE Existing-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/01/2009
ROADWAY SEGMENT: Main Street Bypass - Vintage Parkway to Norcross Lane
NOTES: Project Name - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 0 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 22.69

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE Existing-10
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/01/2009
ROADWAY SEGMENT: Main Street Bypass - Norcross Lane to Main Street
NOTES: Project Name - Existing

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 0 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 22.69

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE Cumulative (2030) w/o Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/01/2009
ROADWAY SEGMENT: Main Street - Empire Avenue to Miguel Drive
NOTES: Project Name - Cumulative (2030) w/o Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 28100 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.18

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	100.6	211.9	454.1

TABLE Cumulative (2030) w/o Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/01/2009
ROADWAY SEGMENT: Main Street - Miguel Drive to Vintage Parkway
NOTES: Project Name - Cumulative (2030) w/o Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 28900 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.30

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	102.4	215.9	462.7

TABLE Cumulative (2030) w/o Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/01/2009
ROADWAY SEGMENT: Main Street - Vintage Parkway to Norcross Lane
NOTES: Project Name - Cumulative (2030) w/o Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 28500 SPEED (MPH): 30 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.55

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	78.1	166.6	358.2

TABLE Cumulative (2030) w/o Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/01/2009
ROADWAY SEGMENT: Main Street - Norcross Lane to O'Hara Avenue
NOTES: Project Name - Cumulative (2030) w/o Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 28700 SPEED (MPH): 30 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.58

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	78.4	167.4	359.9

TABLE Cumulative (2030) w/o Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/01/2009
ROADWAY SEGMENT: Main Street - O'Hara Avenue to Roase Avenue
NOTES: Project Name - Cumulative (2030) w/o Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 26300 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.81

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	94.4	202.1	434.6

TABLE Cumulative (2030) w/o Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/01/2009
ROADWAY SEGMENT: Norcross Lane - South of Main Street
NOTES: Project Name - Cumulative (2030) w/o Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1000 SPEED (MPH): 25 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 50.73

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE Cumulative (2030) w/o Project-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/01/2009
ROADWAY SEGMENT: O'Hara Avenue - South of Main Street
NOTES: Project Name - Cumulative (2030) w/o Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 4000 SPEED (MPH): 25 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 56.75

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	73.0

TABLE Cumulative (2030) w/o Project-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/01/2009
ROADWAY SEGMENT: Main Street Bypass - Main Street to Vintage Parkway
NOTES: Project Name - Cumulative (2030) w/o Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 0 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 22.69

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE Cumulative (2030) w/o Project-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/01/2009
ROADWAY SEGMENT: Main Street Bypass - Vintage Parkway to Norcross Lane
NOTES: Project Name - Cumulative (2030) w/o Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 0 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 22.69

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE Cumulative (2030) w/o Project-10
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/01/2009
ROADWAY SEGMENT: Main Street Bypass - Norcross Lane to Main Street
NOTES: Project Name - Cumulative (2030) w/o Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 0 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 22.69

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE Cumulative (2030) with Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/01/2009
ROADWAY SEGMENT: Main Street - Empire Avenue to Miguel Drive
NOTES: Project Name - Cumulative (2030) with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 38700   SPEED (MPH): 35   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24   SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.57

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
61.1	123.3	261.7	561.8

TABLE Cumulative (2030) with Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/01/2009
ROADWAY SEGMENT: Main Street - Miguel Drive to Vintage Parkway
NOTES: Project Name - Cumulative (2030) with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8700   SPEED (MPH): 35   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24   SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.08

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	99.3	209.0

TABLE Cumulative (2030) with Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/01/2009
ROADWAY SEGMENT: Main Street - Vintage Parkway to Norcross Lane
NOTES: Project Name - Cumulative (2030) with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 9700 SPEED (MPH): 30 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 61.87

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	81.9	175.0

TABLE Cumulative (2030) with Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/01/2009
ROADWAY SEGMENT: Main Street - Norcross Lane to O'Hara Avenue
NOTES: Project Name - Cumulative (2030) with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 9700 SPEED (MPH): 30 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 61.87

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	81.9	175.0

TABLE Cumulative (2030) with Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/01/2009
ROADWAY SEGMENT: Main Street - O'Hara Avenue to Roase Avenue
NOTES: Project Name - Cumulative (2030) with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 37800 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.39

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
56.6	119.8	257.1	553.3

TABLE Cumulative (2030) with Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/01/2009
ROADWAY SEGMENT: Norcross Lane - South of Main Street
NOTES: Project Name - Cumulative (2030) with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1900 SPEED (MPH): 25 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 53.51

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE Cumulative (2030) with Project-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/01/2009
ROADWAY SEGMENT: O'Hara Avenue - South of Main Street
NOTES: Project Name - Cumulative (2030) with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8600 SPEED (MPH): 25 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 59.49

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	57.5	121.7

TABLE Cumulative (2030) with Project-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/01/2009
ROADWAY SEGMENT: Main Street Bypass - Main Street to Vintage Parkway
NOTES: Project Name - Cumulative (2030) with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 30800 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.58

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	106.6	225.1	482.7

TABLE Cumulative (2030) with Project-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/01/2009
ROADWAY SEGMENT: Main Street Bypass - Vintage Parkway to Norcross Lane
NOTES: Project Name - Cumulative (2030) with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 31900 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.73

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	109.0	230.4	494.1

TABLE Cumulative (2030) with Project-10
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/01/2009
ROADWAY SEGMENT: Main Street Bypass - Norcross Lane to Main Street
NOTES: Project Name - Cumulative (2030) with Project

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 31000 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.60

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	107.1	226.1	484.8