



Santa Ana and Garden Grove Fixed Guideway Corridor

Environmental Assessment/
Draft Environmental Impact Report



MAY 2014



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ACRONYMS

Acronyms	Definition
AA	Alternative Analysis
AADT	Annual Average Daily Traffic
ACMs	asbestos containing materials
ACS	American Community Survey
ADA	Americans with Disabilities Act
APE	Area of Potential Effect
Basin	South Coast Air Basin
BMPs	Best Management Practices
BRT	bus rapid transit
CAA	Clean Air Act
CAAA	Clean Air Act Amendment
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CEQA	California Environmental Quality Act
CFR	Code of Federal Register
CMP	Congestion Management Program
CO	carbon monoxide
CPUC	California Public Utilities Commission
CRHR	California Register of Historical Resources
CWA	Clean Water Act
dBA	A-weighted decibel(s)
DEIR	Draft Environmental Impact Report
DMU	light diesel multiple unit
EA	Environmental Assessment
EJ	environmental justice
FEMA	Federal Emergency Management Agency
FIRMs	Flood Insurance Rate Maps
FONSI	Finding of No Significant Impact
FTA	Federal Transit Administration
FTIP	Federal Transportation Improvement Program
GGFD	Garden Grove Fire Department
GGPD	Garden Grove Police Department
HABS	Historic American Building Survey
HAER	Historic American Engineering Record
HCM	Highway Capacity Manual
I-5	Interstate 5
ICU	Intersection Capacity Utilization
IEOC	Inland Empire-Orange County Line
IOSs	Initial Operable Segments

Acronyms	Definition
kWh	kilowatt-hours
LBP	lead based paint
LCP	Local Coastal Programs
L _{dn}	day-night sound level, dBA
LEP	limited English proficiency
L _{eq}	equivalent sound level, dBA
LID	Low impact development
LOS	Level of Service
LOSSAN	Los Angeles-San Diego-San Luis Obispo
LPA	Locally Preferred Alternative
LRT	light rail transit
MDA	Major Development Area
mph	miles per hour
MSAT	mobile source air toxics
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NO ₂	nitrogen dioxide
NOA	Notice of Availability
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NSAs	noise sensitive areas
O & M	Operation and Maintenance
O ₃	ozone
OCFA	Orange County Fire Authority
OCTA	Orange County Transportation Authority
OCTAM	Orange County Transportation Analysis Model
PE	Pacific Electric
PE ROW	Pacific Electric right-of-way
PM ₁₀	particulate matter ten microns or less in diameter
PM _{2.5}	particulate matter 2.5 microns or less in diameter
POAQC	Projects of Air Quality Concern
ppm	parts per million
PRT	personal rapid transit
ROW	right-of-way
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
RWQCB	Regional Water Quality Control Board
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SA-GG	Santa Ana-Garden Grove
SAPD	Santa Ana Police Department
SARB	Santa Ana River Basin

Acronyms	Definition
SARHP	Santa Ana Register of Historical Properties
SARTC	Santa Ana Regional Transportation Center
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SO ₂	sulfur dioxide
SUSMP	Standard Urban Stormwater Mitigation Plan
SWPP	Stormwater Pollution Prevention Program
TDM	Transportation Demand Management
TIP	Transportation Improvement Plan
TPSSs	traction power substations
TSM	Transportation System Management
Uniform Act	Uniform Relocation Assistance and Real Property Acquisition Policies Act
USEPA	U.S. Environmental Protection Agency
V/C	volume-to-capacity
VIA	Visual Impact Assessment
VMT	vehicle miles traveled

Introduction

This Environmental Assessment/Draft Environmental Impact Report (EA/DEIR) presents information pertaining to the environmental impacts of the Santa Ana–Garden Grove (SA-GG) Fixed Guideway Project. The Cities of Santa Ana and Garden Grove are the project proponents. The Federal Transit Administration (FTA) is the federal lead agency pursuant to the National Environmental Policy Act (NEPA). The City of Santa Ana is the local lead agency under the California Environmental Quality Act (CEQA). The Orange County Transportation Authority (OCTA) is a responsible agency under CEQA.

Organization of the EA/DEIR

The organization of this EA/DEIR is as follows:

- ES Executive Summary
- 1.0 Purpose and Need
- 2.0 Alternatives
- 3.0 Affected Environment/Environmental Consequences
- 4.0 References, Organizations, and Persons Consulted
- 5.0 List of Preparers

Appendices

- Appendix A Preliminary Jurisdictional Delineation
- Appendix B Biological Technical Report
- Appendix C Community Impact Assessment
- Appendix D Section 4(f) Evaluation
- Appendix E Visual Impact Assessment
- Appendix F Cultural Resources Evaluation Report
- Appendix G Paleontological Technical Memorandum
- Appendix H Hazardous Materials Initial Site Assessment
- Appendix I Traffic Impact Assessment Report
- Appendix J Noise and Vibration Technical Report
- Appendix K Air Quality Impact Analysis
- Appendix L Energy Output Tables
- Appendix M Water Resources Technical Report
- Appendix N Bridge Design Options Technical Memorandum
- Appendix O Engineering Drawings
- Appendix P Drainage Technical Report

Focus and Format of the EA/DEIR

This environmental document responds to both federal (NEPA) and State (CEQA) requirements. It was prepared in the context of the FTA planning and project development process, which is described below in the Executive Summary. It was also prepared concurrently with the Alternatives Analysis (AA) for the SA-GG Fixed Guideway Project. The

AA details the process the cities of Santa Ana and Garden Grove followed to screen project alternatives and arrive at the reduced set of alternatives which is the focus of this EA/DEIR. The AA is available under separate cover at the City of Santa Ana Ross Annex or online at <http://www.ci.santa-ana.ca.us/transitvision>.

Consistent with the requirements of NEPA and CEQA, this document evaluates a reasonable range of alternatives. Specifically, the EA/DEIR focuses on four alternatives identified through the public scoping and AA processes: a No Build Alternative; a Transportation Systems Management (TSM) Alternative; and two streetcar alternatives - Streetcar 1 and Streetcar 2. In addition, several design options have been developed for the two streetcar alternatives to either avoid identified constraints or to take advantage of specific opportunities presented along the proposed alignments.

The combined EA/DEIR presents evaluation criteria, detailed analysis, findings and mitigation measures for all of the environmental focus areas for which adverse or significant impacts could occur if any of the alternatives were implemented. Separate sections are provided for those environmental focus areas where no impacts are expected, for construction impacts, and for cumulative impacts.

Because there are subtle differences between NEPA and CEQA environmental focus areas, **Table I-1** has been prepared to help readers locate the specific sections of the EA/DEIR in which NEPA and CEQA analyses can be found, listed by the category appropriate to each act.

Intended Use of the EA/DEIR

Following public review of the EA/DEIR, responses to comments will be prepared and the Santa Ana and Garden Grove City Councils will select a Locally Preferred Alternative (LPA) to be carried forward for preliminary engineering and final design. As the lead agency under CEQA, the Santa Ana City Council will certify the Final EIR, adopt appropriate findings, approve the Mitigation Monitoring and Reporting Program, issue a Notice of Determination, and file a Notice of Completion. It is anticipated that FTA will issue a Finding of No Significant Impact (FONSI) for the project.

TABLE I-1: NEPA AND CEQA ANALYSES WITHIN THE EA/DEIR

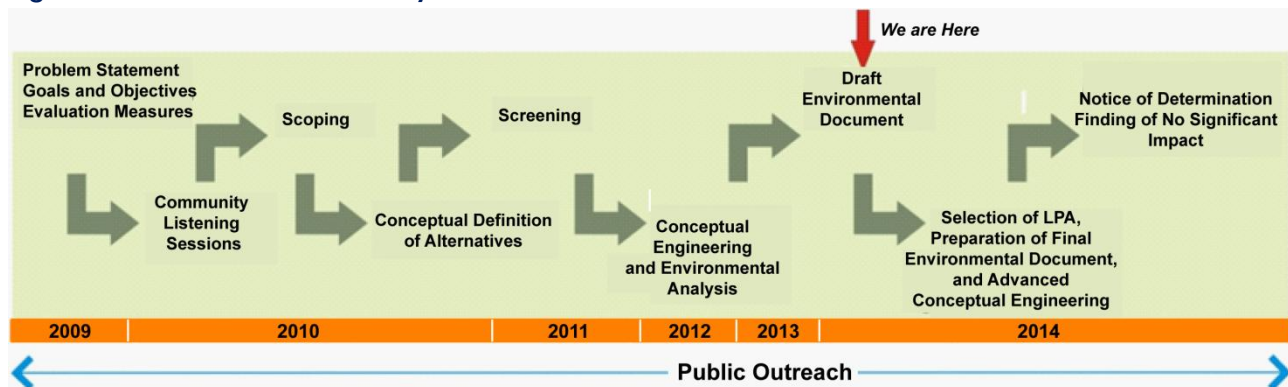
Environmental Issue Area	NEPA Discussion	CEQA Discussion
Aesthetics	N/A	3-86
Agricultural Resources	N/A	3-14
Air Quality	3-150	3-156
Biological Resources	N/A	3-217
Coastal Zones	3-1	N/A
Community Effects	3-35	N/A
Cultural Resources	3-88	3-96
Ecologically Sensitive Areas	3-2	N/A
Economic Effects	3-27	N/A
Endangered and/or Threatened Plant and Animal Species	3-2	N/A
Energy Resources	3-166	N/A
Environmental Justice	3-35	N/A
Geology, Soils and Seismicity	3-98	3-101
Hazards & Hazardous Materials	3-103	3-109
Land Acquisition and Displacements	3-15	3-28
Land Use and Zoning	3-2	3-12
Right-of-Way, Relocations, Utility Coordination	3-15	3-28
Mineral Resources	N/A	3-101
Noise and Vibration	3-128	3-146
Population and Housing	N/A	3-28
Public Services	N/A	3-60
Recreation	N/A	3-221
Safety and Security	3-180	N/A
Section 4(f) Resources	3-30	N/A
Socio-Economics	3-35	N/A
Transportation, Traffic and Parking	3-111	3-125
Utilities/Service Systems	N/A	3-219
Visual Quality	3-63	3-86
Water Quality, Hydrology and Floodplains	3-169	3-177
Wetlands and Navigable Waterways	3-1	3-177
Construction	3-188	3-211
Cumulative Impacts	3-226	3-226
Other Considerations	N/A	3-217

Executive Summary

The SA-GG Fixed Guideway Project is a transit improvement project being considered by the Cities of Santa Ana and Garden Grove in cooperation with OCTA and FTA to improve mobility and provide other community enhancements. Working together, these agencies have prepared an environmental review of the proposed transit improvements in the corridor, with FTA serving as the federal lead agency for the EA under NEPA and the City of Santa Ana serving as lead agency for the DEIR under CEQA. This summary describes the planning and environmental review processes for the SA-GG Fixed Guideway Project.

The SA-GG Fixed Guideway Study was undertaken in the context of the FTA planning and project development process, a systematic analysis approach that provides detailed information to help federal, State, and local officials make informed decisions about major transit capital investments. The FTA planning and project development process includes five phases: (1) system planning; (2) alternatives analysis and environmental review; (3) preliminary engineering; (4) final design; and (5) construction. As projects are advanced through these phases, their design, costs, benefits, and impacts become more clearly defined. The current phase, Phase 2, culminates in the selection of a LPA and certification of the environmental document, as illustrated in **Figure ES-1**.

Figure ES-1. Alternatives Analysis and Environmental Review Process



Location of the SA-GG Fixed Guideway Transit Corridor

The SA-GG Fixed Guideway Study Area is located in central Orange County, California and directly accesses both the Los Angeles-San Diego-San Luis Obispo (LOSSAN) rail corridor and the Pacific Electric right-of-way (PE ROW) rail corridor. Running predominantly in an east-west direction, the corridor extends 4.2 miles through the City of Santa Ana and into the eastern portion of the City of Garden Grove. The Study Area is generally bounded by Harbor Boulevard to the west, 17th Street to the north, Grand Avenue to the east, and 1st Street to the south. The eastern terminus of the alignment is the Santa Ana Regional Transportation Center (SARTC) and the western terminus is the Harbor Boulevard/Westminster Avenue intersection. Two Initial Operating Segments (IOSs) are also being assessed that would extend 2.2 miles from SARTC to Raitt Street. The Study Area, with key activity centers, is shown in **Figure ES-2**.

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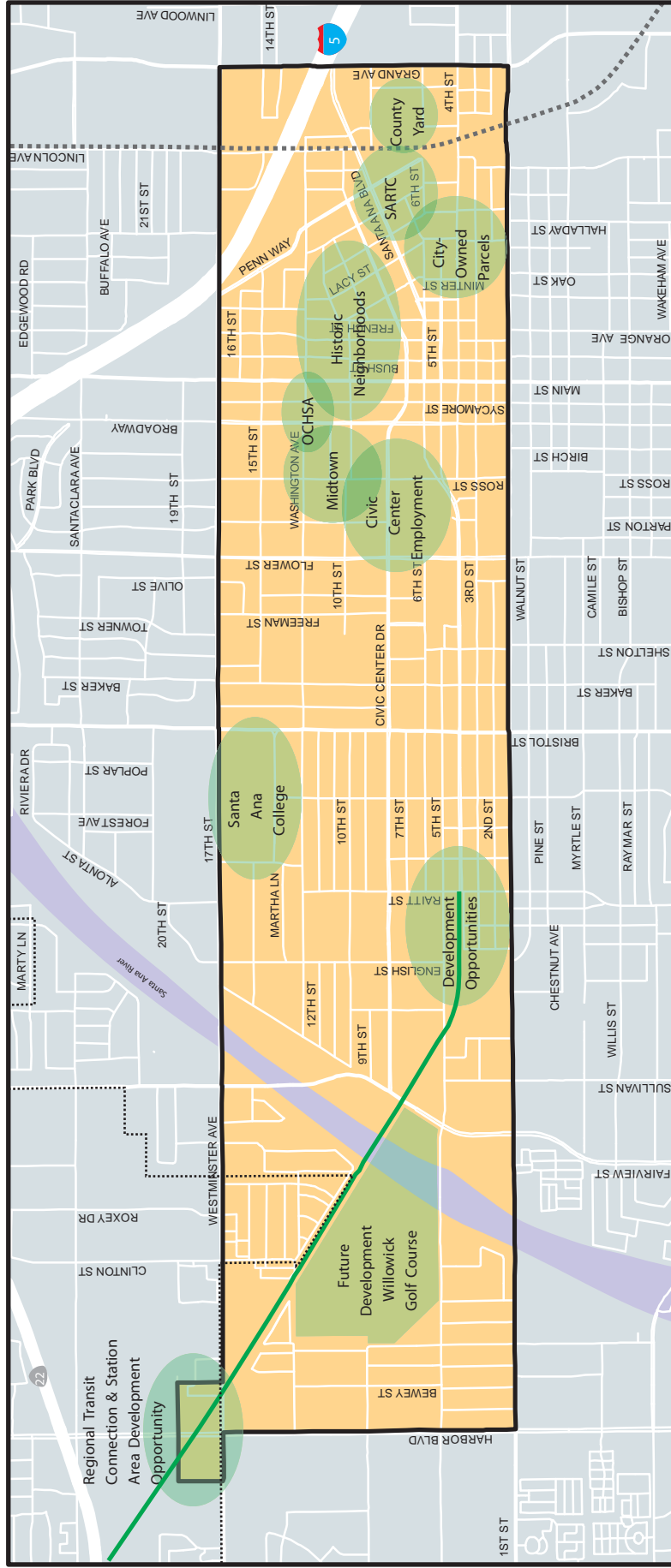


Santa Ana-Garden Grove Fixed Guideway Project

Figure ES-2



Study Area



LEGEND:

- Study Area
- Activity Center
- PE ROW
- Metrolink/Amtrak Rail Line
- Boundary of City of Garden Grove

Source: Cordoba Corporation, Draft Alternatives Analysis Report for the Santa Ana-Garden Grove Fixed Guideway Corridor Study, April, 2014.

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Previous Planning Studies

Formal planning for the SA-GG Fixed Guideway Project began in 2008 when the OCTA launched its Go Local – Transit Connections to Metrolink program. However, the concept of providing local transit connections dates back to the early 1900s when the Pacific Electric Railway linked the cities to Los Angeles. In fact, the alignment alternatives evaluated in the SA-GG Fixed Guideway Project actually travel along the historic route – through the PE ROW at the west end of the Study Area, through historic Downtown Santa Ana, to SARTC -- the busiest multi-modal transportation hub in Orange County. Once a busy rail corridor, the PE ROW in Orange County is now a 100-foot wide strip of vacant land which OCTA has preserved for future transit use while allowing temporary interim uses along some sections.

Purpose of this Environmental Document

The environmental review process provides the public with an opportunity to review and comment on the alternatives and the environmental analysis presented in the EA/DEIR. This EA/DEIR evaluates selected alternatives against future conditions without the project under NEPA (No Build Alternative) and the existing conditions under CEQA. Where appropriate, mitigation measures are identified to reduce the severity of potentially adverse environmental effects that may result from implementation of the proposed project.

The EA/DEIR does not make recommendations regarding the approval or denial of the SA-GG Fixed Guideway Project. Rather, it is intended as a disclosure document to inform public agency decision-makers and the public of the environmental effects of the alternatives and design options that are under consideration. The Cities of Santa Ana and Garden Grove shall consider the information included in this EA/DEIR, along with other information which may be presented to them, prior to adopting the LPA. Other agencies, such as the California State Office of Historic Preservation, Orange County Department of Public Works, California Public Utilities Commission (CPUC), Orange County Sheriff-Coroner Department, California Energy Commission, Department of Toxic Substances Control, Orange County Flood Control District, U.S. Army Corps of Engineers, and California Department of Transportation have also been involved in reviewing the project.

Environmental Review Process

This EA/DEIR has been prepared to meet the requirements of NEPA and CEQA. As required by these laws, the environmental review process must be completed before the proposed project can be approved by the City of Santa Ana (acting as the lead agency for Santa Ana and Garden Grove) and the FTA. Meaningful public engagement was an important component of the SA-GG Fixed Guideway Project from the start. Well before any key decisions were made, the City of Santa Ana initiated a public scoping process to help define the appropriate range of issues to be addressed in the EA/DEIR. Four scoping meetings were conducted for the general public between June 8 and June 12, 2010. Two of these meetings were scheduled in the evening, one meeting was scheduled in the morning and one meeting was scheduled on a Saturday afternoon, providing those community members who could not attend any of the weekday

evening meetings with an opportunity to participate. Public comment opportunities were made available at each meeting. It should also be noted that articles and advertisements were published in a number of local newspapers, including several non-English publications. All information materials were presented in English as well as Spanish.

The alternatives identified for evaluation in this EA/DEIR were based on public comments as well as technical analyses, as detailed in the AA Report (under separate cover and available by request or on the City's website at <http://www.ci.santa-ana.ca.us/transitvision>). Following receipt of public comments on the EA/DEIR, the Santa Ana and Garden Grove City Councils will select an LPA for the Fixed Guideway Project. Their decision will be based on a combination of environmental impacts, community input, cost, ridership and economic development considerations brought to light through the EA/DEIR, AA, and public review process. Subsequent to the City actions, the LPA will be presented to the OCTA Board of Directors. If necessary to address comments received during the environmental public review, additional engineering may be performed to refine the conceptual design of the LPA prior to presentation to the City Councils. If a hybrid alternative which results in changes outside the envelope of environmental effect is selected, then an environmental re-evaluation may be needed.

Purpose and Need for the Proposed Project

Santa Ana and Garden Grove are mature, densely populated, and ethnically diverse cities located in the heart of Orange County, California. Transit service equity is an important issue for the Study Area, where the median household income is slightly above the U.S. Census Bureau poverty level threshold and approximately 17.8 percent of households are without an automobile and therefore must rely on ridesharing, public transportation or non-motorized transportation for all of their travel needs. Approximately 91 percent of the Study Area population is non-white; approximately 31.9 percent are under the age of 15 and therefore not eligible to drive an automobile.¹ More than half of Study Area residents use modes of transportation other than the single-occupant automobile for their travel to/from work including approximately 13.8 percent of Study Area residents who use public transportation.²

Santa Ana and Garden Grove's overall vision for the Study Area includes a transit system that integrates seamlessly with the community, provides connections to regional Metrolink and Amtrak commuter rail services at the SARTC, and is compatible with the established urban character.

The purpose of the SA-GG Fixed Guideway Project is to:

- Improve Transit Connectivity within the Study Area;
- Relieve Congestion by Providing Alternative Mobility Options;
- Be Sensitive to the Character of the Community;
- Increase Transit Options;
- Improve Transit Accessibility to and within the Study Area; and

¹ US Census 2000.

² Census: Journey to Work 2000.

- Provide Benefits to the Environment through Improved Air Quality.

The following summarizes the needs for the project:

- Missing Transit Links
- Congested Freeways and Arterials
- Limited Transportation Improvement Options
- Limited Travel Choices
- Significant Level of Transit Dependence
- Automobile Emissions Contribute to Unhealthy Air Quality

Chapter 1.0 of this EA/DEIR provides detailed descriptions of each purpose and need identified above.

Consideration of Alternatives

The alternatives analysis process, which is described in detail in the SA-GG Fixed Guideway AA Report, consisted of four major steps: (1) Preliminary Definition of Alternatives, which included creating a range of conceptual alternatives that could potentially satisfy the Purpose and Need and meet the goals and objectives for the project; (2A) Initial Screening (Route Options) to eliminate route options with fatal flaws and those that do not satisfy the Purpose and Need and meet the goals and objectives of the project; (2B) Initial Screening (Technology Options) to eliminate technology options with fatal flaws and those that do not satisfy the Purpose and Need and meet the goals and objectives of the project and determine the reduced set of alternatives to be carried forward for detailed analysis; and (3) Detailed Evaluation and Environmental Impact Analysis of the reduced set of alternatives and selection of the LPA.

The alternatives analysis process included a comprehensive review of potential technology and alignment options. A wide range of public transit options were defined and investigated as candidate technologies. The initial alignment options were based on the need to establish an east-west transit corridor in the Study Area, and to improve the Study Area's regional transit connectivity by providing direct connections to existing and planned transit services (Metrolink and OCTA fixed route and BRT services) at SARTC and at the northeast corner of Harbor Boulevard and Westminster Avenue in the City of Garden Grove.

A summary discussion of the technologies and alignment options considered for the project, as well as the process followed to develop the reduced set of alternatives which are evaluated in this EA/DEIR are provided in Section 2.9 of this document. The SA-GG Fixed Guideway AA Report provides a full discussion of the alternatives development and analysis process and is available under separate cover at the City of Santa Ana Ross Annex or online at <http://www.ci.santa-ana.ca.us/transitvision>.

Alternatives

The alternatives addressed in this EA/DEIR consist of a No Build Alternative, TSM Alternative and Streetcar Alternatives 1 and 2, and IOS-1 and IOS-2. The No Build Alternative is provided as a basis for comparing the build alternatives, each of which was specifically designed to respond to purpose and need, study goals, and community input.

Several other alternatives, including BRT routes along Santa Ana Boulevard and Civic Center Drive, were considered in the initial screening process, but were ultimately screened out. The BRT alternatives did not best meet the Purpose and Need or project goals and objectives and were less cost effective in terms of both capital and O&M costs per rider than Streetcar Alternative 1 and 2.

To reduce costs and impacts and to provide optimum accessibility, the TSM and streetcar alternatives would operate entirely or substantially in mixed-flow traffic within the existing urban street setting. While the streetcar alternatives utilize the PE ROW in the western portion of the Study Area, the TSM improvements do not since the PE ROW is unpaved and would require construction of a roadway in order to operate buses along it.

TSM Alternative. Consistent with FTA guidelines, the TSM Alternative enhances the mobility of existing transportation facilities and the transit network without construction of major new transportation facilities or significant, costly physical capacity improvements. It, therefore, emphasizes low cost (i.e., small physical) improvements and operational efficiencies such as focused traffic engineering actions, expanded bus service, and improved access to transit services. **Figure ES-3** is a map of the proposed routes for the TSM bus network enhancements. Included within the TSM Alternative are modifications and enhancements to selected bus routes in the Study Area; intersection/signal improvements; and bus stop amenity upgrades. The TSM Alternative would provide increased transit operations and service levels along roadways within the Study Area which currently support fixed route bus transit.

Streetcar Alternative 1. To connect the City of Garden Grove with SARTC in Santa Ana, Streetcar Alternative 1 would utilize the PE ROW, an abandoned and vacant rail right-of-way owned by OCTA, through the western half of its alignment and generally operate along Santa Ana Boulevard, and 4th Street on the way to SARTC. The 4.2-mile alignment for Streetcar Alternative 1 would include 12 stations. **Figure ES-4** shows the alignment and the station locations for Streetcar Alternative 1. It is anticipated that the streetcar system would operate seven days a week with 10-minute headways during peak periods and 15-minute headways during off-peak periods. The streetcars would be electrically powered using an overhead contact system and a series of Traction Power Substations (TPSSs) located intermittently along the alignment. Refer to the discussion below for further details regarding the key attributes and design options associated with Streetcar Alternative 1.

In Streetcar Alternative 1, the Downtown segment features couplet operations with the westbound streetcar alignment on Santa Ana Boulevard, and the eastbound streetcar alignment on 4th Street. For the eastbound transition from Santa Ana Boulevard to 4th Street,

a direct route would be provided from Santa Ana Boulevard along a public easement on the southern edge of Sasser Park to 4th Street, as illustrated in Figures 3.6-8 and 3.6-9 (pages 3-81 and 3-82).

Streetcar Alternative 2. Streetcar Alternative 2 would also utilize the PE ROW through the western half of its alignment and substantially operate along Santa Ana Boulevard, Civic Center Drive, and 5th Street along the eastern half of the alignment to SARTC. The operational characteristics of this alternative are identical to Streetcar Alternative 1. The differences between the two streetcar alternatives are the alignment and the fact that Streetcar Alternative 2 would have one additional station for a total of 13. **Figure ES-5** shows the alignment and the station locations for Streetcar Alternative 2. Refer to the discussion below for further details regarding the key attributes and design options associated with Streetcar Alternative 2.

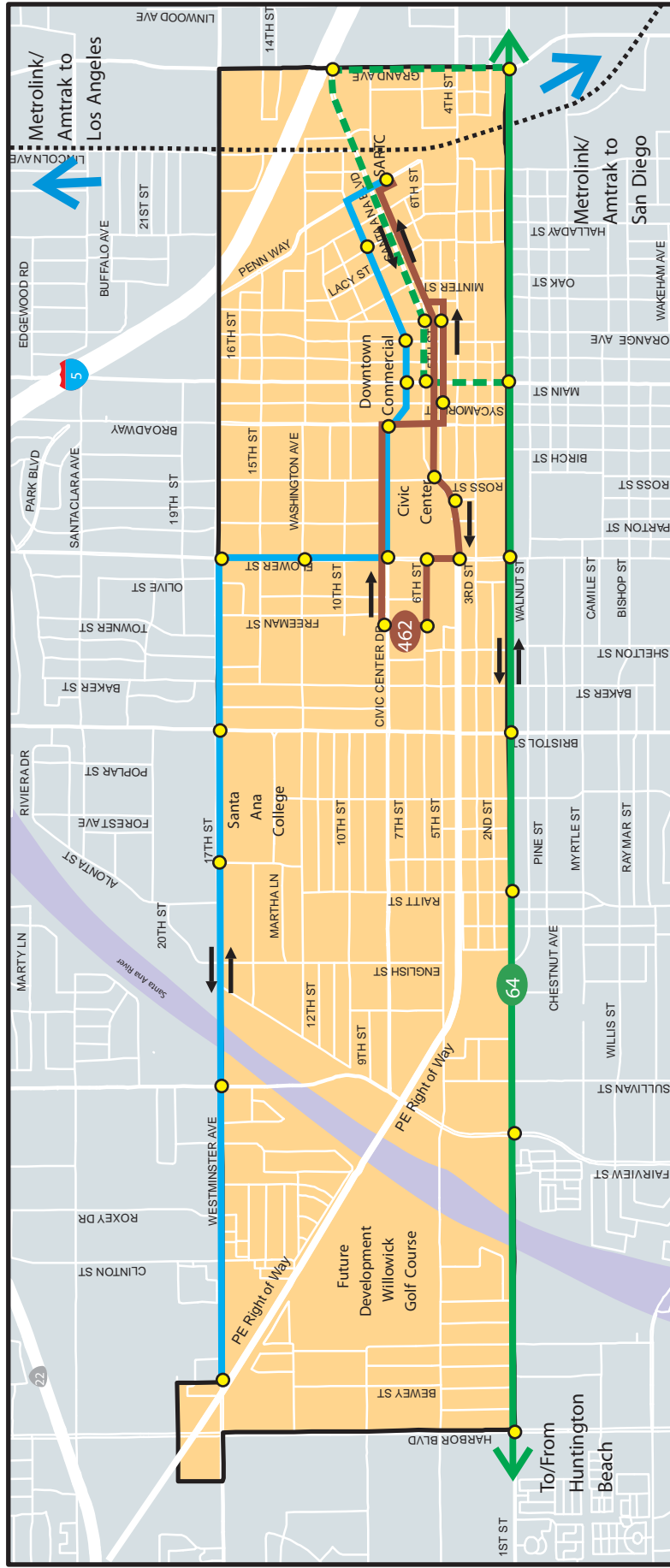
The Streetcar Alternative 2 alignment travels westbound through the Civic Center along Civic Center Drive between Spurgeon and Flower Streets. As part of the City of Santa Ana's Complete Streets Program, bicycle lanes are proposed for Civic Center Drive. Streetcar Alternative 2 would acquire additional right-of-way to accommodate the bicycle lane.

Initial Operating Segments. In response to funding and phasing issues raised by fiscal constraints identified during OCTA's long-range transportation planning process, IOSs, which are shorter segments of Streetcar Alternatives 1 and 2, were developed for the SA-GG Fixed Guideway Project. The intent of the IOSs is to identify starter segments that could be constructed and operated until funding is assembled to complete the projects. Both IOS-1 and IOS-2 would terminate at Raitt Station (Raitt Street and Santa Ana Boulevard) rather than Harbor Station (Harbor Boulevard and Westminster Avenue). Both would include the same project features and design options as their respective full alignment build alternatives between Raitt Street and SARTC. The alignments for IOS-1 and IOS-2 are shown in **Figure ES-6**.

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Transportation Systems Management (TSM) Alternative



LEGEND:

- Study Area
- Proposed Stop
- TSM 1st Street Alignment (OCTA Route 64)
- TSM Civic Center Alignment
- Skip Stop Overlay to/from SARTC
- TSM Station Link Enhancement (OCTA BRT Route 462)

0 1500 3000 FEET

NORTH

Source: Cordoba Corporation, Draft Alternatives Analysis Report for the Santa Ana-Garden Grove Fixed Guideway Corridor Study, April, 2014.

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Streetcar Alternative 1 Alignment



LEGEND:

- Study Area
- Proposed Stop
- Streetcar Alternative 1
- Station Name
- TPSS

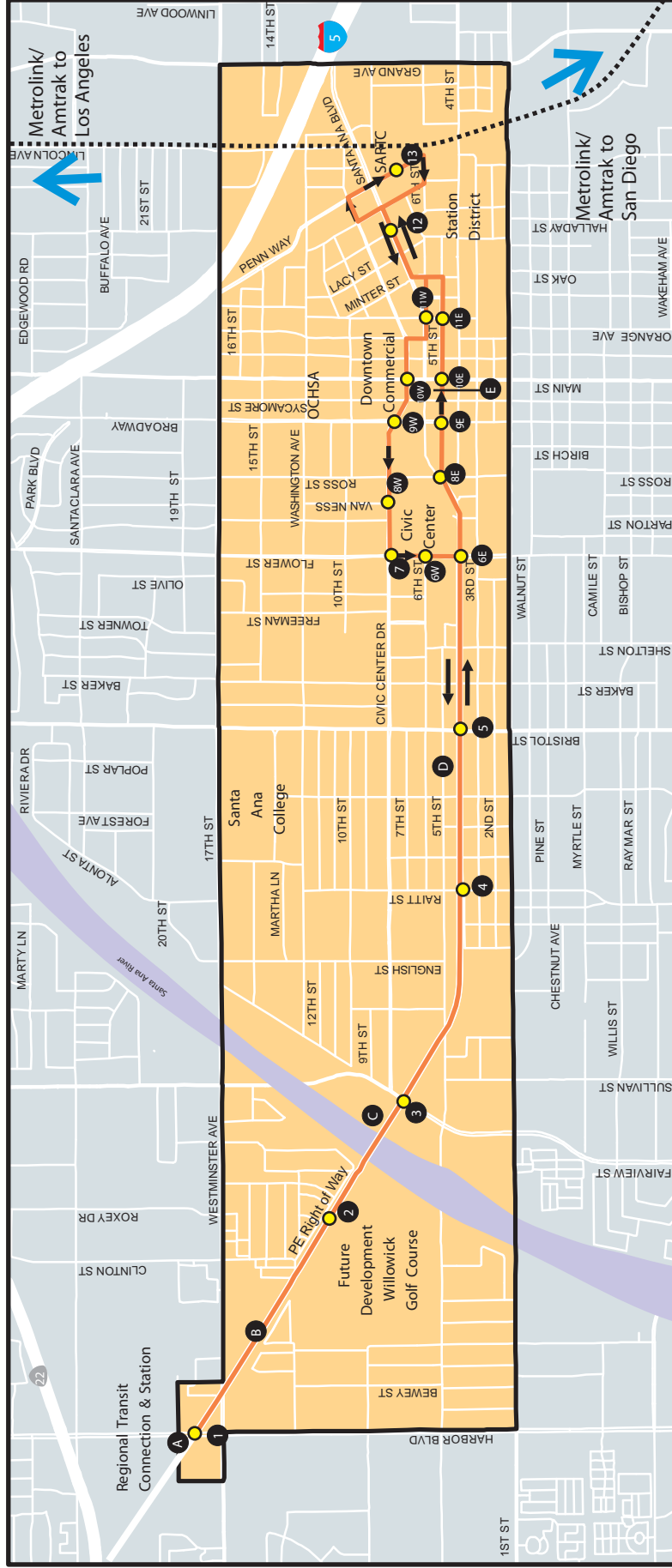
0 1,500 3,000 FEET

Source: Cordoba Corporation, *Draft Alternatives Analysis Report for the Santa Ana-Garden Grove Fixed Guideway Corridor Study*, April, 2014.
 Note: Termini for Initial Operable Segment 1 (IOS-1) are located at Raitt Street and SARTC.

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Streetcar Alternative 2 Alignment



LEGEND:

- Study Area
- Proposed Stop
- Streetcar Alternative 2
- Station Name
- TPSS

Scale: 0, 1500, 3000 FEET

NORTH

Source: Cordoba Corporation, *Draft Alternatives Analysis Report for the Santa Ana-Garden Grove Fixed Guideway Corridor Study*, April, 2014.
 Note: Termini for Initial Operable Segment 2 (IOS-2) are located at Raitt Street and SARTC.

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Santa Ana-Garden Grove Fixed Guideway Project

Figure ES-6



IOS-1 and IOS-2 Alignments



LEGEND:

- Proposed Stop
- IOS 1
- IOS 2
- TPSS
- IOS-1 Station Name
- IOS-2 Station Name

Study Area

0 1,500 3,000 FEET

Source: Cordoba Corporation, Draft Alternatives Analysis Report for the Santa Ana-Garden Grove Fixed Guideway Corridor Study, April, 2014.

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Key Attributes of the Streetcar Alternatives

Western Terminus Design Option Elevated Crossing. The western terminus for both of the streetcar alternatives is located at the northeast corner of Harbor Boulevard and Westminster Avenue; the transition from the PE ROW to the western terminus site will include an elevated crossing, as illustrated in Figure 2-9 (page 2-18) and Figure 3.6-6 (page 3-78).

Santa Ana River Bridge. Both streetcar alternatives would utilize the PE ROW and cross over the Santa Ana River. This alignment was once used for the Pacific Electric Railway red car system and the Old Pacific Electric Santa Ana River Bridge, now designated as a historic bridge, still remains. Currently, it is closed and has not been utilized by vehicles or pedestrians since 1950. The historic bridge is inadequate to accommodate the proposed fixed guideway due to its age, size, (it was constructed as a single track bridge), disrepair, undetermined structural integrity (both superstructure and foundation) and non-compliance with current building and safety requirements. As detailed in the Section 4(f) Evaluation, Appendix D, and Bridge Design Options Technical Memorandum, Appendix N, four design options were developed for Streetcar Alternatives 1 and 2 at the Santa Ana River Crossing. One was determined feasible for carrying forward for analysis in the EA/DEIR. The existing bridge would remain in its current location and condition and would not be affected by the proposed project. A new single-track bridge would be constructed immediately south of the existing bridge for the fixed guideway. Through the use of gates and signaling, the single-track bridge would accommodate bi-directional fixed guideway traffic.

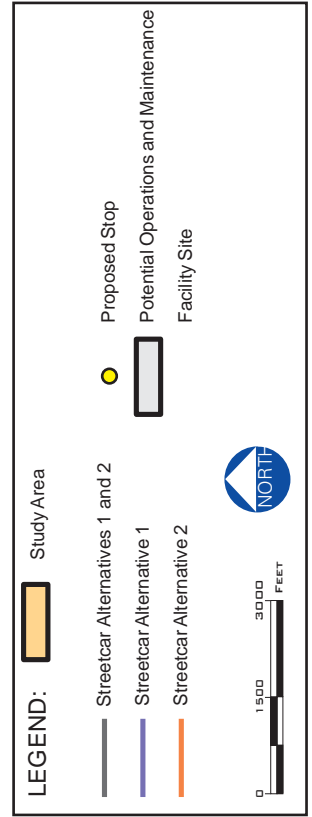
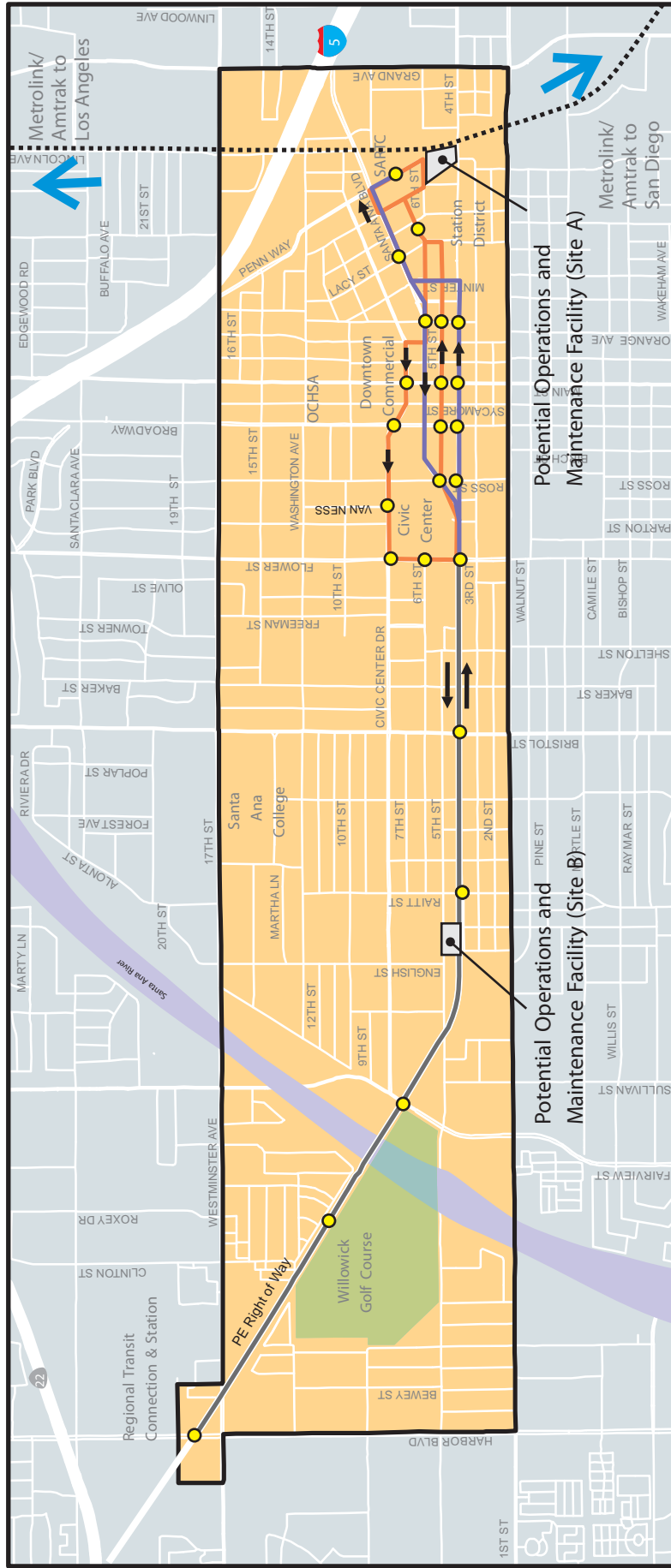
Design Options

In response to public and agency input, design options were evaluated in the EA/DEIR for the Operations & Maintenance (O & M) Facility associated with Streetcar Alternatives 1 and 2 and IOS-1 and IOS-2 along with 4th Street Parking associated with Streetcar Alternative 1 and IOS-1.

Operations & Maintenance (O &M) Facility Site Options. Both Streetcar Alternatives 1 and 2 would require the construction of an O & M Facility for streetcar operations. An O & M Facility is a stand-alone building which would meet the maintenance, repair, operational and storage needs of the proposed streetcar system. The O & M Facility accommodates daily and routine vehicle inspections, interior/exterior cleaning of the streetcars, preventative (scheduled) maintenance, unscheduled maintenance, and component change-outs. The proposed facility would also provide a venue for parking vehicles that are not in use and for rebuilding components. Two candidates O & M Facility Sites have been identified for the Streetcar Alternatives, as shown in **Figure ES-7:**



Candidate Sites of Operations and Maintenance Facilities



- **O & M Facility Site A.** Site A is an irregularly shaped parcel near SARTC slightly larger than 2.2 acres, and bordered by 6th Street to the north, 4th Street to the south, the Metrolink tracks to the east, and various industrial and commercial businesses to the west. Currently used as a waste transfer and recycling center, this site contains one primary structure with the remainder of the site used for receiving and sorting recycling materials, as well as parking. Refer to Figures 2-12 and 2-13 (pages 2-23 and 2-24) for illustrations.
- **O & M Facility Site B.** Site B is a rectangular site slightly larger than 2.4 acres. It is located west of Raitt Street and is bordered by 5th Street to the north and the PE ROW to the south. Located in an area zoned for industrial and commercial uses, this site is comprised of three parcels, two of which contain existing businesses and a combination of industrial buildings. The third parcel contains several residences. Refer to Figures 2-14 and 2-15 (pages 2-25 and 2-26) for illustrations.

Fourth Street Parking Scenarios. The Streetcar Alternative 1 alignment would utilize 4th Street between Ross Street and Mortimer Street in the eastbound direction. From east of Ross Street to French Street, 4th Street has one travel lane in each direction with head-in diagonal parking along each side of the roadway. The diagonal parking, with vehicles exiting parking spaces by backing into the travel lane, is incompatible with streetcar operations. Three design scenarios were identified to address the diagonal parking on 4th Street as illustrated in Figure 2-16 (page 2-28) and described below.

Scenario A: Convert the diagonal parking along the south side of 4th Street, between Ross Street and French Street, to parallel parking, widen the sidewalk along the south side from 12 feet to 20 feet, and replace streetlights and landscaping. A total of 26 on-street parking spaces would be removed under this scenario.

Scenario B: Remove the diagonal parking along the south side of 4th Street, between Ross Street and French Street, widen the sidewalk along the south side from 12 feet to 28 feet, and replace streetlights and landscaping. A total of 77 on-street parking spaces would be removed under this scenario.

Scenario C: Remove the diagonal parking along both sides of 4th Street, between Ross Street and French Street, widen the sidewalks along both sides from 12 feet to 28 feet, and replace streetlights and landscaping on both sides of the street. A total of 132 on-street parking spaces would be removed under this scenario.

Ridership

Streetcar Alternative 1 is estimated to have the highest daily ridership, attracting between 3,770 and 8,400 riders. At the low end, this represents approximately 22 percent more riders than the TSM Alternative (3,085); at the high end, it represents approximately 172 percent more riders than with the TSM Alternative. IOS-1 is estimated to have approximately 2,012 to 4,490 daily riders, or approximately 47 percent fewer riders than the full alignment.

Streetcar Alternative 2 would perform second best with an estimate of between 3,020 and 6,425 daily riders. At the low end, this would be equivalent to the TSM Alternative; at the high end, it represents approximately 108 percent more riders than with the TSM Alternative. IOS-2 is estimated to have approximately 1,540 to 3,280 daily riders, or approximately 47 percent fewer than the full alignment.

Financial Analysis and Evaluation

The SA-GG Fixed Guideway AA Report includes a detailed discussion of the anticipated costs associated with the proposed project. The capital, maintenance facility, and O & M costs are summarized below.

Capital Cost Estimates. The capital cost estimates presented in **Table ES-1** are based on plans that were developed to approximately five to ten percent level of design. The capital costs are, therefore, preliminary and will be refined during subsequent phases. At this early stage of the planning process, healthy contingencies are applied to the cost estimates. It is anticipated that the contingencies will be reduced substantially as the project progresses. High and low ranges are based on a range of contingency assumptions and whether or not various design options are included, such as the 4th Street parking scenarios.

TABLE ES-1: PRELIMINARY CAPITAL COST ESTIMATES (IN 2011 \$1,000,000)		
Alternative	Low	High
TSM	\$14.5	
Streetcar 1	\$197.4	\$209.7
Streetcar 2	\$217.0	\$228.1
IOS-1	\$146.5	\$158.8
IOS-2	\$166.2	\$177.2

Source: Cordoba Corporation, Santa Ana and Garden Grove Fixed Guideway Corridor Study Draft Alternatives Analysis Report, April 2014.

Maintenance Facility Capital Cost Estimates. Streetcar Alternatives 1 and 2 include the same two design options for the maintenance facility and the facilities proposed to be constructed on each of these sites are identical. The cost difference between the options is approximately \$11 million, and is related to the estimated cost to acquire the right-of-way. O & M Facility Site A would cost approximately \$37.4 million and O & M Facility Site B would cost approximately \$26.4 million.

O & M Cost Estimates. O & M cost projections are important for assessing cost effectiveness and to conduct financial planning. The TSM bus costs were estimated based on current transit cost information provided by OCTA. The O & M cost projections for the streetcar alternatives were based on operating cost per revenue hour derived from historical Portland and Seattle bus-to-streetcar O & M cost per revenue vehicle hour ratios. These ratios were averaged and applied to the OCTA bus cost per revenue vehicle hour. The estimated O & M cost for each build alternative is summarized in **Table ES-2**.

TABLE ES-2: ANNUAL O & M COST ESTIMATES				
	TSM	TSM - SARTC TO HARBOR ROUTE ONLY	Streetcar Alternative 1	Streetcar Alternative 2
Annual Revenue Miles	1,061,590	419,120	332,015	363,459
Annual Revenue Hours	105,664	35,152	26,364	32,656
Peak Vehicles	22	8	6	7
Annual O & M Costs	\$13,282,258	\$5.1M	\$4,933,284	\$6,110,656
Cost Per Revenue Mile	\$12.51	\$12.07	\$14.86	\$16.81
Cost Per Revenue Hour	\$125.70	\$143.94	\$187.12	\$187.12

Source: Cordoba Corporation, Santa Ana and Garden Grove Fixed Guideway Corridor Study Draft Alternatives Analysis Report, April 2014.

Summary of Impacts

Table ES-3 summarizes the potential adverse effects associated with the implementation of Streetcar Alternatives 1 and 2. No impacts would occur from the implementation of the TSM Alternative. The information presented in Table ES-3 is a summary of the analysis contained in Chapter 3.0 of this EA/DEIR.

As illustrated in Table ES-3, adverse effects associated with hazardous materials, operational noise (moderate), safety, and construction air quality are anticipated to occur prior to incorporation of mitigation measures (CEQA only). Each of these adverse effects would result from implementation of Streetcar Alternatives 1 and 2, IOS-1, and IOS-2. Mitigation measures would eliminate the adverse effects associated with hazardous materials and safety. Moderate effects associated with operational noise and identified in the EA/DEIR would remain after the implementation of mitigation, however these effects would not be considered adverse (see Section 3.11). In addition, significant construction air quality impacts under CEQA would remain after the implementation of mitigation; however, it should be noted that construction-related air quality impacts would be temporary and not adverse under NEPA after the implementation of mitigation. No adverse effects were identified for the TSM Alternative.

In addition to mitigation measures, design features and best management practices have been incorporated into the proposed project. These include a Traffic Management Plan, a Noise and Vibration Control Plan, and a number of features to manage water quality. Refer to Chapter 3.0 of the EA/DEIR for detailed discussions of these features and best management practices.

TABLE ES-3: SUMMARY OF EFFECTS, MITIGATION MEASURES, AND EFFECTS AFTER MITIGATION

Environmental Resource/Effect	Impact Before Mitigation?	Mitigation Measures	Impact After Mitigation?	
			NEPA	CEQA
Coastal Zones	No	None Required	No	No
Wetlands and Navigable Waterways	No	None Required	No	No
Ecologically Sensitive Areas	No	None Required	No	No
Endangered and/or Threatened Plant and Animal Species	No	None Required	No	No
Land Use and Zoning	No	None Required	No	No
Land Acquisition and Displacements	No	None Required	No	No
Section 4(f) Resources	No	None Required	No	No
Community Effects and Environmental Justice	No	None Required	No	No
Visual Quality	No	None Required	No	No
Cultural Resources	No	<p>CR1 A qualified principal investigator who meets the Secretary of the Interior’s professional qualification standards for an archeologist shall be responsible for managing Native American archaeological resources and human remains. The qualified principal investigator shall appoint an archaeological monitor to be present for ground-disturbing activities that could encounter undisturbed soils. If the qualified principal investigator determines that Native American archaeological resources and human remains are likely present, then both an archeological monitor and a Native American monitor identified by the principal investigator shall be present. The Native American monitor shall be a Native American identified by the applicable tribe and/or the Native American Heritage Commission. The timing and duration of the monitoring shall be determined by the principal investigator based on the sensitivity of exposed sediments.</p> <p>Prior to initiation of earth-disturbing activities that could encounter undisturbed soils; the archaeological monitor shall conduct a brief awareness training session for all construction workers and supervisory personnel. The training shall explain the importance of and legal basis for the protection of significant archaeological resources. Each worker shall learn the proper procedures to follow in the event that cultural resources or human remains/burials are uncovered. These procedures include work curtailment or redirection and the immediate contact of the site supervisor and the archaeological monitor. It is recommended</p>	No	No

TABLE ES-3: SUMMARY OF EFFECTS, MITIGATION MEASURES, AND EFFECTS AFTER MITIGATION

Environmental Resource/Effect	Impact Before Mitigation?	Mitigation Measures	Impact After Mitigation?	
			NEPA	CEQA
		<p>that this worker education session include visual images of artifacts that might be found in the project vicinity, and that the session take place on-site immediately prior to the start of ground-disturbing activities.</p> <p>If archaeological resources or human remains are encountered during construction, all work shall cease in the area of potential affect until the find can be addressed. The Orange County Coroner’s Office shall be contacted pursuant to procedures set forth in Public Resources Code Section 5097 et seq. and Health and Safety Code in Sections 7050.5, 7051, and 7054 with respect to treatment and removal, Native American involvement, burial treatment, and re-burial, if necessary. A fifty-foot buffer, or more if deemed appropriate by the principal investigator, shall be established and work outside the buffer may resume.</p> <p>Areas that would not encounter undisturbed soils and would therefore not be required to retain an archaeologist shall demonstrate non-disturbance to the City of Santa Ana through the appropriate construction plans, as-built drawings, or geotechnical studies prior to any earth-disturbing activities. Impacts to any significant resources shall be mitigated to a less-than-significant level through data recovery or other methods determined adequate by the archaeologist and that are consistent with the Secretary of the Interior's Standards for Archaeological Documentation. Any identified cultural resources shall be recorded on the appropriate DPR 523 form and filed with the SCCIC.</p>		
Geology, Soils, and Seismicity	No	None Required	No	No

TABLE ES-3: SUMMARY OF EFFECTS, MITIGATION MEASURES, AND EFFECTS AFTER MITIGATION

Environmental Resource/Effect	Impact Before Mitigation?	Mitigation Measures	Impact After Mitigation?	
			NEPA	CEQA
Hazardous Materials	Yes	<p>HAZ1 If Operations & Maintenance (O & M) Facility Site A is chosen to service transit vehicles, the City of Santa Ana shall require a Phase I Environmental Site Assessment to be prepared for the following site:</p> <ul style="list-style-type: none"> • Madison Materials located at 1035 East 4th Street <p>If O & M Facility Site B is chosen to service transit vehicles, a Phase I Environmental Site Assessment shall be prepared for the following sites:</p> <ul style="list-style-type: none"> • All Car Auto Parts located at 2002 West 5th Street • SA Recycling located at 2006 West 5th Street • American Auto Wrecking located at 1908 West 5th Street <p>The assessment shall be prepared by a Registered Environmental Assessor. The assessment shall be prepared in accordance with State standards/guidelines to evaluate whether the site or the surrounding area is contaminated with hazardous substances from the potential past and current uses including storage, transport, generation, and disposal of toxic and hazardous waste or materials. If hazardous materials are identified in the Phase I Environmental Site Assessment, a Phase II Environmental Site Assessment would be completed to identify the extent of contamination and the procedures for remediation. The Phase II Environmental Site Assessment shall be approved by the California Department of Toxic Substances Control.</p>	No	No
Traffic and Parking	No	None Required	No	No
Noise and Vibration	Yes	<p>N1 The City of Santa Ana shall request a horn-sounding exemption from the California Public Utilities Commission for the crossing at 5th and Fairview Streets. The exemption shall provide justification and demonstrate that safety would not be compromised. In lieu of the warning horn, supplemental safety measures (e.g., four-quad gates, roadway median barriers on grade crossing approaches, and pedestrian gates) would be implemented. If a horn sounding exemption is approved and established, warning horns would not be sounded except under an emergency situation.</p> <p>N2 When practical, the contractor shall design special trackwork elements, such as turn-outs, switches, and cross-over to be located at least 600 feet away from sensitive receptors. If this cannot be</p>	No	No

TABLE ES-3: SUMMARY OF EFFECTS, MITIGATION MEASURES, AND EFFECTS AFTER MITIGATION

Environmental Resource/Effect	Impact Before Mitigation?	Mitigation Measures	Impact After Mitigation?	
			NEPA	CEQA
		<p>achieved, then special switch devices, such as spring frogs or movable point frogs shall be utilized. A frog device is used where two rails cross. The frog is designed to ensure the wheel crosses the gap in the rail without “dropping” into the gap.</p> <p>N3 If O & M Facility Site B is selected by the City of Santa Ana, the contractor shall construct a noise barrier at the land uses identified as Noise Sensitive Areas 9 and 10. For receptors in Noise Sensitive Area 9, the noise barrier shall be at least 10 feet high and extend for 400 feet along the northern property edge of the proposed operations and maintenance facility. For receptors in Noise Sensitive Area 10, the noise barrier shall be at least 8 feet high and extend for 225 feet along the southern boundary of the PE ROW adjacent to 4th Street. The design of the noise barriers shall be identified on project plans prior to issuance of building permits.</p>		
Air Quality	No	None Required	No	No
Energy Resources	No	None Required	No	No
Water Quality, Hydrology, and Floodplains	No	The City of Santa Ana is required by federal law to obtain necessary permits from the Regional Water Quality Control Board (Section 401 permit) and US Army Corps of Engineers (Section 404 permit) for operational activities affecting waters of the US.	No	No
Safety and Security	Yes	<p>SAF1 Under Streetcar Alternatives 1 and 2 and the IOS Alternatives, the City of Santa Ana shall coordinate with the Santa Ana Unified School District and Santa Ana Police Department regarding safety at schools adjacent to the alignment. The collaborative effort between the City and interested parties shall develop and teach rail safety measures to students and parents. Other precautionary safety features shall include signs, gated crossing, and crossing and traffic signals to create a safe environment for parents and students during pick-up/drop-off times.</p> <p>SAF2 The contractor shall install surveillance cameras along the pedestrian walking paths within the PE ROW and at pedestrian gates to adjacent neighborhoods. Police security personnel shall be responsible for surveillance camera monitoring.</p> <p>SAF3 The contractor shall install emergency call boxes along the pedestrian walking paths within the PE ROW.</p> <p>SAF4 The contractor shall design the lighting plan for the pedestrian walking paths within the PE ROW to eliminate shadows or dimly lit areas to the greatest extent feasible.</p>	No	No

TABLE ES-3: SUMMARY OF EFFECTS, MITIGATION MEASURES, AND EFFECTS AFTER MITIGATION

Environmental Resource/Effect	Impact Before Mitigation?	Mitigation Measures	Impact After Mitigation?	
			NEPA	CEQA
		<p>SAF5 Within the PE ROW, the contractor shall fence the track area, and appropriate signage and audible and visual warning devices shall be installed at gate openings.</p> <p>SAF6 If Mitigation Measures SAF2 through SAF4 are considered infeasible, then the Willowick Station shall not be made operational by the contractor until an appropriate public access point from the PE ROW is created as part of the Willowick Golf Course redevelopment.</p>		
Construction	Yes	<p>AQ1 During the construction phase, the contractor shall use Tier 4 or higher off-road construction equipment with higher air pollutant emissions standards.</p> <p>Refer to Water Quality, Hydrology, and Floodplains above for information related to water resources permits.</p>	No	Yes
Secondary and Cumulative	Yes (Construction - Air Quality)	See Mitigation Measure AQ-1 .	No	Yes

Source: Terry A. Hayes Associates Inc., 2014.

Areas of Controversy and Issues to be Addressed

The City of Santa Ana has hosted a number of meetings with the community and local businesses to solicit questions and concerns related to the alternatives. It is anticipated that potential areas of controversy would be related to the removal on-street parking on Fourth Street, the reclamation of OCTA right-of-way used by Templo Calvario Church patrons for parking, and selection of the O & M Facility site. In addition to the decisions regarding the selection of the preferred alternative, design options, interim operable segments, and maintenance facility site, various design and construction-related issues and special activities will need to be addressed as planning and design of the project proceed.

Site-specific studies will be required to develop precise impact avoidance and mitigation plans and to ensure regulatory compliance. These include but are not limited to the following:

- An Archaeological and Paleontological Resources Monitoring and Mitigation Plan, which will specify the appropriate mitigation measures to be implemented in the event archaeological resources, fossil, or human remains are identified during ground disturbance. The Plan would allow for the salvage of potentially scientifically significant fossils and associated data that otherwise might be lost to earth-moving and excavation. The preparation of the Plan is included as a mitigation measure.
- An Unanticipated Discovery Plan regarding potential effects to undiscovered cultural resources.
- Phase I Environmental Site Assessment for the selected O & M Facility. The preparation of this assessment is included as a mitigation measure.
- Additional geologic/seismic studies for regulatory compliance related to the design of the Santa Ana River Bridge. These studies would support final design of the bridge to avoid/minimize the risk of fault ruptures.
- A Transportation Management Plan.
- Best management practices to ensure safety and security, access for emergency vehicles, reduce surface runoff and water pollution, noise, erosion, and minimize construction effects.

Stakeholder, agency, and community coordination will be required during advanced design, including but not limited to the following:

- Coordination with the United States Army Corps of Engineers, Santa Ana Regional Water Quality Control Board, Orange County Department of Public Works, and Orange County Parks to minimize impacts at the Santa Ana River crossing.
- Coordination with the Santa Ana Unified School District and Santa Ana Police Department regarding safety at schools adjacent to the alignment.
- Coordination with security personnel at the Ronald Reagan Federal Building and United States Courthouse.
- Coordination with property owners/agencies regarding the construction schedule

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Chapter 1.0 Purpose and Need

The following discussion summarizes the key attributes of the purpose and need for the SA-GG Fixed Guideway Project, highlighting those factors that had a direct bearing on the development of a range of transportation investment alternatives for the corridor.

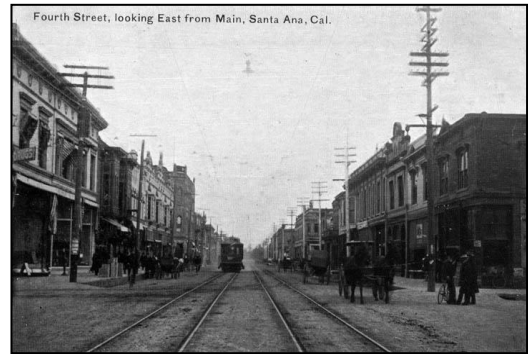
1.1 Project History

In 2008, the Cities of Santa Ana and Garden Grove completed a study that identified the benefits of developing a fixed guideway corridor to link key activity and employment centers in their communities to SARTC. In 2009, the Cities initiated the AA and EA/DEIR for the SA-GG Fixed Guideway Project in coordination with OCTA. Funding for the Santa Ana and Garden Grove Fixed Guideway Project was awarded to the City of Santa Ana in 2008 through OCTA’s four-step Go Local Program, which provides competition-based grants to local jurisdictions that have an interest in initiating local transit connections to Metrolink.

1.2 Location and Study Area History

The regional location of the proposed project is shown in **Figure 1-1** and the Study Area, with key activity centers, is shown in **Figure 1-2**. The proposed project is regionally located in central Orange County, California and directly accesses both the Los Angeles-San Diego (LOSSAN) rail corridor and the PE ROW rail corridor. The Study Area is generally bounded by Harbor Boulevard to the west, 17th Street to the north, Grand Avenue to the east, and 1st Street to the south. Santa Ana and Garden Grove are mature, densely populated, and ethnically diverse cities located in the heart of Orange County, California.

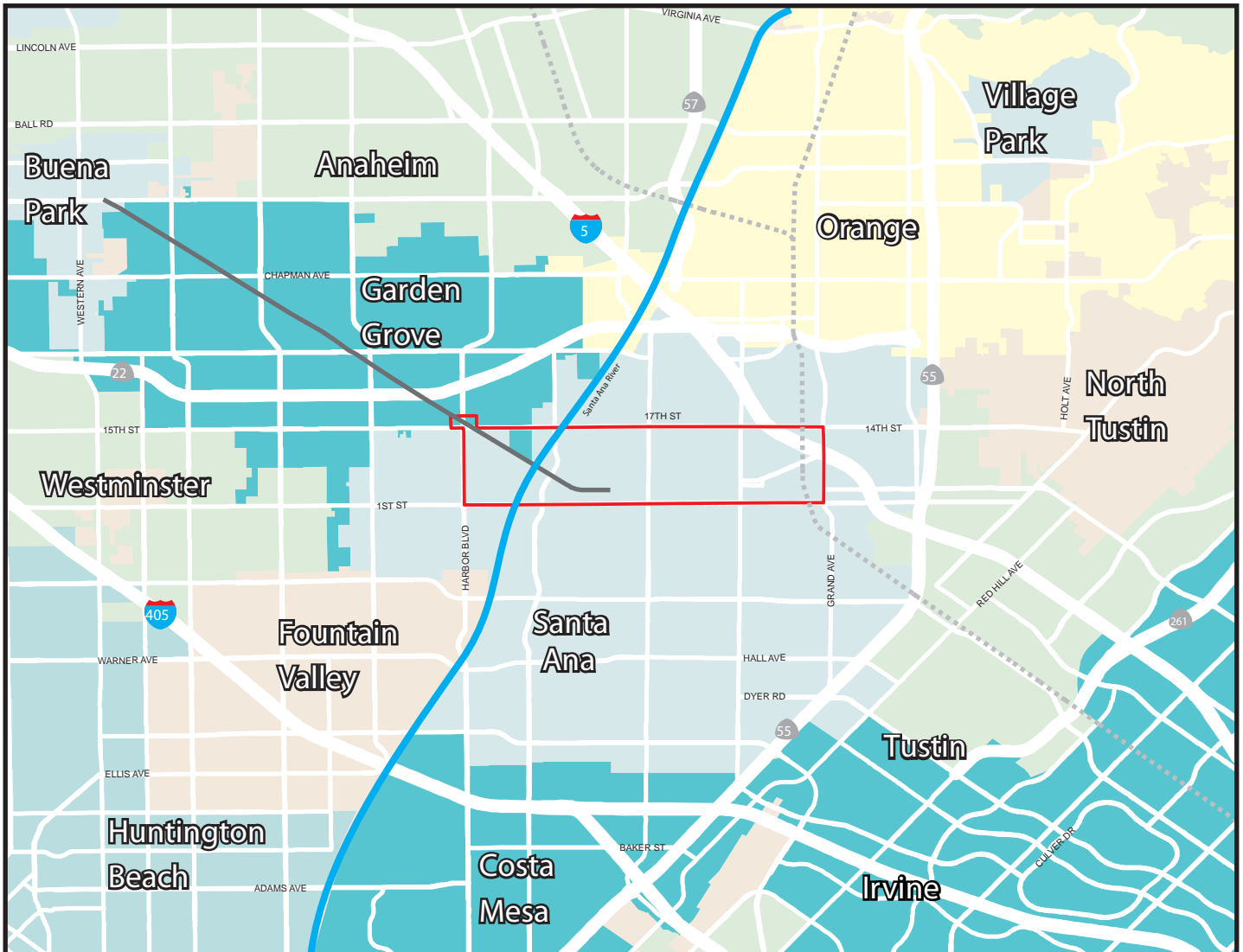
The City of Santa Ana was incorporated in 1886, and when Orange County was formed in 1889, Santa Ana was selected to be the County seat. In 1905, the first Pacific Electric train arrived in Santa Ana and Garden Grove. The Santa Ana-Orange Line operated between the Southern Pacific Santa Ana Station (immediately south of the present day station at the SARTC) and Los Angeles, traveling through Downtown Santa Ana along 4th Street and in the PE ROW, until the early 1950s.






The PE ROW is not currently being used by a railroad. The tracks have been removed and the right-of-way, substantially owned by OCTA through Orange County, is vacant except for temporary uses along some segments permitted by OCTA. It has been preserved for future transit use. In order to connect the City of Garden Grove with SARTC in the City of Santa Ana, the SA-GG Fixed Guideway Project would reintroduce transit to the PE ROW corridor as well as Downtown Santa Ana, which

was originally built around the Pacific Electric Streetcar system.


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LEGEND:

-  Study Area
-  PE ROW
-  Metrolink/Amtrak Rail Line

0 1.1 2.2 MILES



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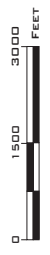
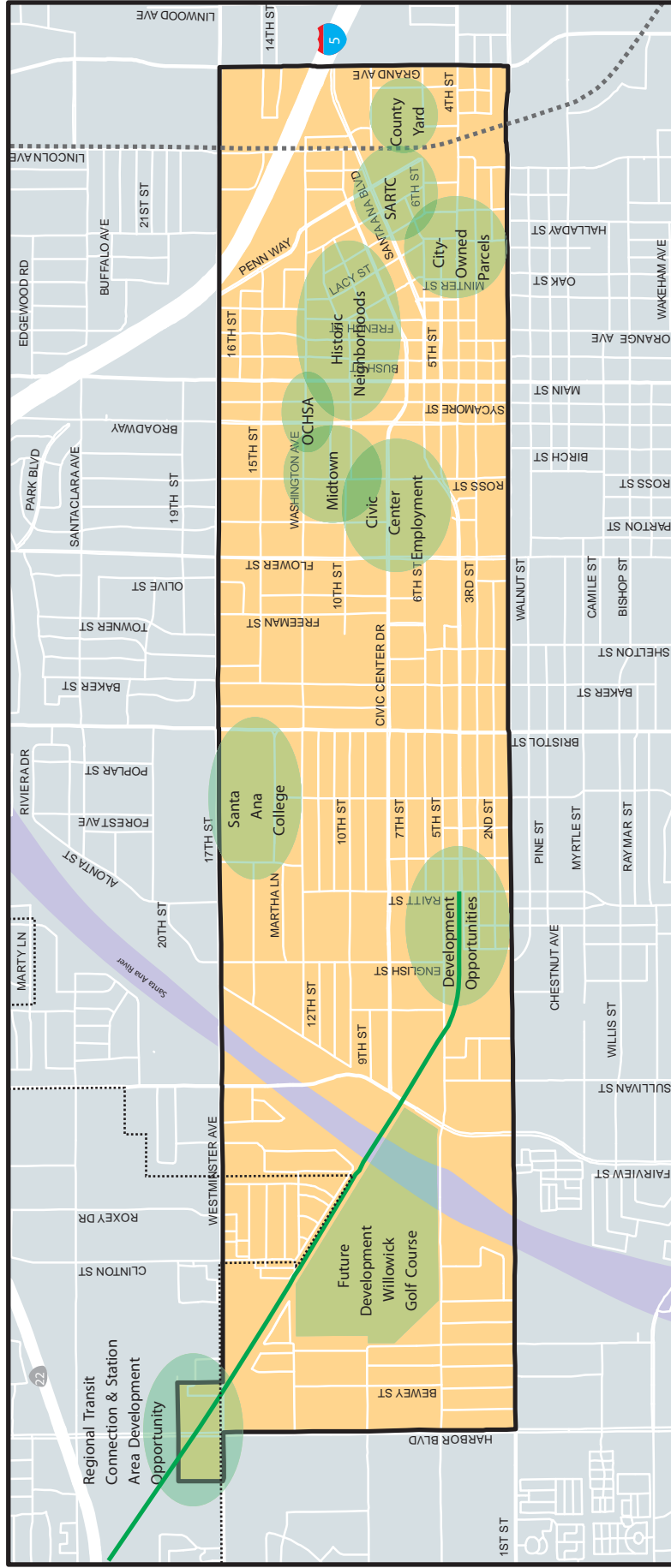


Santa Ana-Garden Grove Fixed Guideway Project

Figure 1-2



Study Area



Source: Cordoba Corporation, Draft Alternatives Analysis Report for the Santa Ana-Garden Grove Fixed Guideway Corridor Study, April, 2014.

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1.3 Characteristics of the Study Area

Santa Ana is the most highly and densely populated city in Orange County and the fifth most densely populated city in the United States with a population of 300,000 or more, behind New York, San Francisco, Boston and Chicago. Garden Grove is the third most densely populated city in Orange County.³

The central portion of the Study Area is a hub of activity. As Orange County's seat of government, Santa Ana's Civic Center houses federal, State and local government agencies, creating high levels of activity, and providing sources of employment and frequently-used services. Downtown Santa Ana, with its historic multi-story buildings housing ground-level retail and restaurants with commercial office space above, is listed as a historical district in the National Register of Historic Places (NRHP). Downtown Santa Ana provides shops and services uses to nearby residents and Civic Center employees, and it is a tourist destination. This portion of the Study Area also includes the French Park Neighborhood, which is listed as a historical district in the NRHP.

The Study Area also has a rich mosaic of neighborhoods each uniquely characterized by its history, culture, architecture, housing types, and amenities. Residents of these neighborhoods value their communities and are well organized to protect and preserve the quality of life they enjoy. The topography, block size and development patterns of these neighborhoods support walkability.

Transit service equity is an important issue for the Study Area, where the median household income is slightly above the U.S. Census Bureau poverty level threshold and nearly 17.8 percent of households are without an automobile and therefore must rely on ridesharing, public transportation or non-motorized transportation for all of their travel needs. Approximately 91 percent of the Study Area population is non-white; approximately 31.9 percent are under the age of 15 and therefore not eligible to drive an automobile.⁴ More than half of Study Area residents use modes of transportation other than the single-occupant automobile for their travel to/from work including approximately 13.8 percent of Study Area residents who use public transportation.⁵

1.4 Demographics in the Study Area

Santa Ana has a population of 324,528 and an average population density of 11,900 people per square mile, making it the most populous and densely populated city in Orange County.⁶ Garden Grove is the third most densely populated City in Orange County with more than 170,883 residents and approximately 9,500 people per square mile. Over the next 20 to 25 years, the population in both Cities is projected to increase by approximately 10 percent.⁷ The area around SARTC is expected to have the highest rate of population growth in the Study Area. Population densities along the proposed fixed guideway route are the highest in

³ 2010 Census: US Municipalities Over 50,000.

⁴ US Census 2000.

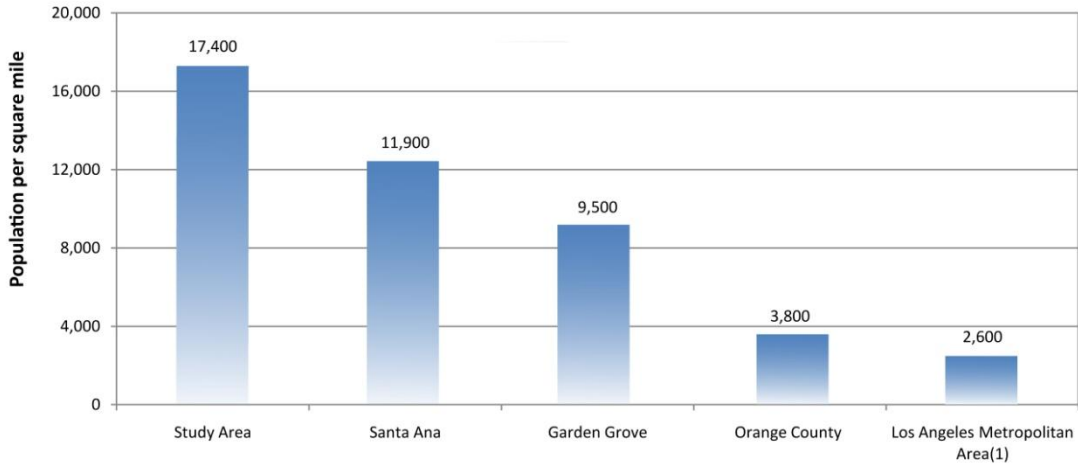
⁵ Census: Journey to Work 2000.

⁶ US Census 2010.

⁷Orange County Projections 2006 (OCP-2006).

Orange County. **Figure 1-3** compares Study Area population density to that of Santa Ana, Garden Grove, Orange County and the Los Angeles Metropolitan Area.

Figure 1-3: Comparison of Study Area Population Density



¹ Los Angeles-Long Beach-Santa Ana Metropolitan Statistical Area encompasses Los Angeles and Orange Counties

Source: U.S. Census 2010

With regard to population densities, there are three distinct pockets of over 7,000 people per quarter square mile that are located just north and south of Downtown Santa Ana, within one mile of SARTC and within less than a half-mile walking distance of the proposed alignment. Over the next 20 to 25 years, forecast population growth in Santa Ana will result in increased density in established neighborhoods within the Study Area, and developing and redeveloping areas bordering the Study Area. Population densities along the proposed fixed guideway route average 17,380 people per square mile.

Federal, State and local government agencies, which are major employers, have offices in the Civic Center and throughout Santa Ana. There are several courthouses within the Civic Center including the Orange County Courthouse, the State Courts, the 4th District Court of Appeal and the Ronald Reagan Federal Building and United States Courthouse. Santa Ana is also home to the corporate headquarters of several major private employers, such as First American Corporation, The Orange County Register, and Wahoo’s Fish Tacos.

In 2007, employment in the City was estimated to be approximately 149,800,⁸ representing roughly 10 percent of all employment in Orange County. Nearly 30 percent of employment within the City is in the Study Area.⁹ Over the next 20 to 25 years, employment within the City is expected to increase by approximately 7 percent.¹⁰

More than 40,000 jobs are concentrated in the Study Area. Forecasters predict that by the year 2030 approximately 810,000 daily trips will start, end, or occur totally within the Study

⁸ Bureau of Labor Statistics, 2007.

⁹ *Ibid.*

¹⁰ *Ibid.*

Area. Although employment in the Study Area is generally focused within the Civic Center and Downtown Santa Ana where densities range from 25,001 to 100,000 employees per square mile, pockets of comparable employment density from 10,001 to 25,000 employees per square mile occur adjacent to and south of SARTC.

1.5 Land Use

The Cities of Santa Ana and Garden Grove recognize that land use, economic opportunity, and transportation planning go hand in hand. Consequently, the SA-GG Fixed Guideway Project integrates adopted land use plans, policies, and zoning with transit design and operational characteristics for each city.

Figure 1-4 shows the portion of the Land Use Element of the City of Santa Ana’s General Plan that encompasses the Study Area. In the eastern portion of the Study Area, land uses are characterized by industrial, low- and medium-density residential, and general commercial development along arterial corridors. In the central portion of the Study Area, the Civic Center is characterized by office and institutional land uses. West of the Civic Center, land uses are largely characterized by low-density residential, general commercial along arterial corridors, concentrated areas of industrial along the PE ROW, and pockets of institutional land uses. The Santa Ana River and Willowick Public Golf Course are also located in the western portion of the Study Area, and are classified as open space. Because the Study Area is urbanized and largely built out, the land uses depicted within the General Plan Land Use Element generally reflect existing land use development patterns.

Santa Ana’s Transit Zoning Code, which was adopted in June 2010, encompasses 450 acres within the Study Area. The vision and intent of the Transit Zoning Code is to provide a transit-supportive, pedestrian-oriented development framework that will facilitate new infill development in existing neighborhoods, reuse of existing buildings, and mixed-use development as a means of improving livability, reducing vehicle trips and lowering greenhouse gas emissions.

Several major activity centers and key neighborhoods within the Study Area have land use characteristics that could potentially benefit from and support the implementation of the SA-GG Fixed Guideway Corridor. These include historic Downtown Santa Ana; Civic Center; three neighborhoods (Logan, historic French Park and Lacy); the Station District; Santa Ana College and Orange County High School of the Arts.

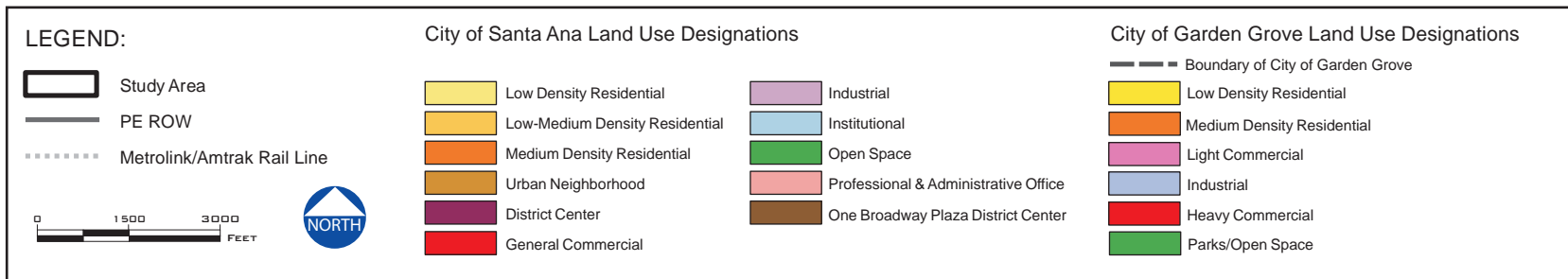
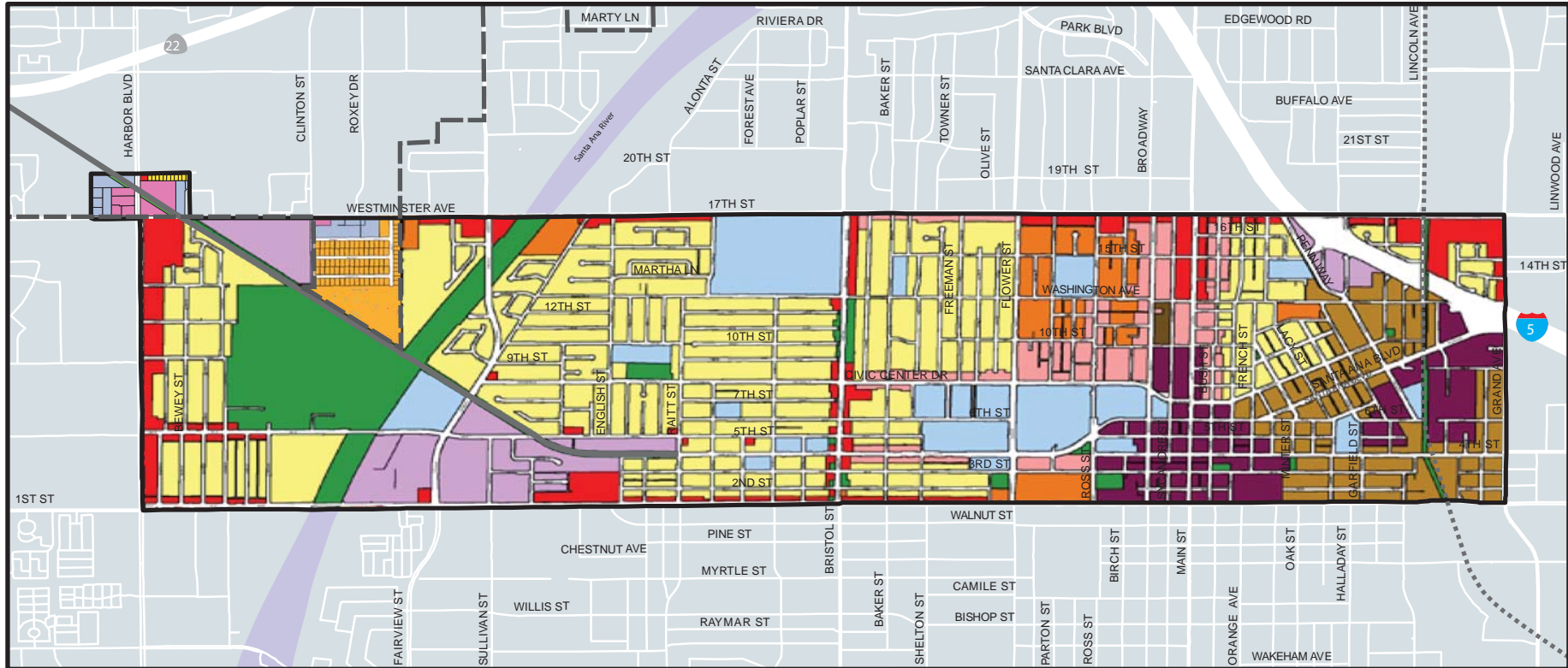
1.6 Transportation Facilities and Services

The Study Area is served by four freeways (Interstate 5 [I-5], State Route 55 [SR 55], State Route 22 [SR 22] and State Route 57 [SR 57]). I-5 passes within one-half mile of the eastern terminus of the proposed project at SARTC and is a major commuter and goods movement corridor. SR 22 is within a mile of the study area and runs parallel to the proposed project.

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Study Area Land Use Designations



Source : City of Santa Ana General Plan Land Use Map and the City of Garden Grove GIS maps; updated by Terry A. Hayes Associates Inc. August 2014.

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All of the freeways in the study area are significantly congested throughout the day. The SA-GG Fixed Guideway Project is designed, in part, to provide congestion relief by attracting more discretionary riders off the freeways and onto regional commuter rail and connecting local transit service.

Several regionally and locally significant roadways traverse the study area, including:

- 4th Street
- 5th Street
- Santa Ana Boulevard
- Civic Center Drive
- Westminster Avenue/17th Street
- Bristol Street
- Flower Street
- Broadway
- Main Street
- Harbor Boulevard

Four intersections in the Study Area currently operate at LOS E or F during either the AM or PM peak period: Westminster Avenue/Harbor Boulevard, Santa Ana Boulevard/Raitt Street, Santa Ana Boulevard/Lacy Street, and 3rd Street/Raitt Street. All other intersections in the Study Area currently operate at LOS D or better during the AM and PM peak periods. Five roadway segments in the Study Area experience capacity deficiencies under existing conditions: 5th Street from Hawley to Raitt Streets, 4th Street from Main to Mortimer Streets, Raitt Street from 5th to 3rd Streets, Bristol Street from 5th to 3rd Streets, Main Street from 5th to 3rd Streets. All other arterial roadway segments in the Study Area operate at acceptable levels. The SA-GG Fixed Guideway Project would provide congestion relief benefits at these intersections and roadway segments by attracting travelers from their cars and onto transit. **Figure 1-5** shows the locations of capacity-deficient intersections and roadway segments within the Study Area.

1.7 Travel Markets

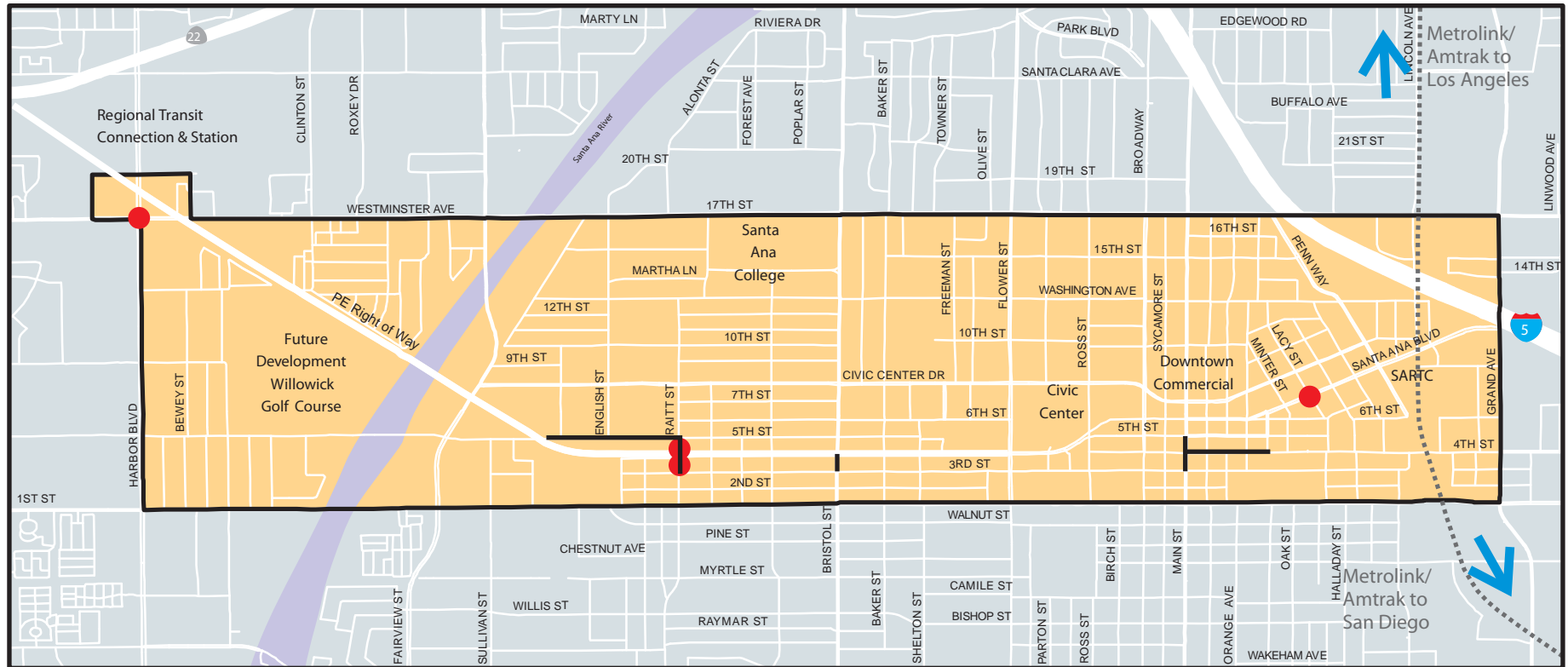
Based on an analysis of existing and future travel conditions within central Orange County, there are three key travel markets that are underserved by the area's current and planned transportation network:

- Connecting Metrolink passengers at SARTC with their destinations in the Study Area, including:
 - Workers who commute by Metrolink
 - Visitors travelling by Metrolink to government services, educational and cultural venues, and shopping and dining opportunities in the Study Area
- Providing for frequent and reliable circulation within the Study Area to connect:
 - Residents with employment and educational opportunities, and goods and services
 - Workers with the restaurants, retail and services they require during the workday, without the use of an automobile
- Connecting residents to the west of the Study Area with activity centers and regional transportation services at SARTC




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Capacity Deficient Intersections and Roadway Segments



LEGEND:

 Study Area	 <u>Intersections</u>	 <u>Roadway Segments</u>
	Westminster Ave/Harbor Blvd	5th St - Howley to Raitt Sts
	Santa Ana Blvd/Raitt St	4th St - Main to Mortimer Sts
	3rd St/Raitt St	Raitt St - 5th to 3rd Sts
	Santa Ana Blvd/Lacy St	Bristol St - 5th to 3rd Sts
		Main St - 5th to 3rd Sts

0 1500 3000 FEET



Source: Cordoba Corporation, Draft Alternatives Analysis Report for the Santa Ana-Garden Grove Fixed Guideway Corridor Study, April, 2014;
 Note: Termini for Initial Operable Segment 1 (IOS-1) are located at Raitt Street and SARTC.

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Figure 1-6 depicts projected travel patterns between the Study Area and the surrounding region in 2035, based on daily trips between the Study Area and key regional subareas forecast by the Orange County Traffic Analysis Model (OCTAM) 3.3. There are estimated to be approximately 810,000 daily trips into, out of, and within the Study Area in 2035.

Connecting Metrolink Passengers at SARTC with Key Destinations

Approximately 25,000 employees travel to the Civic Center to work every day. To avoid peak hour congestion, many employees in the Study Area who live outside the area commute to work using Metrolink to/from SARTC. Some people use Metrolink to travel to government and judicial services in the Civic Center, or to work, school, shopping or dining opportunities in the Study Area. Once at SARTC, their options to reach their destinations are limited. OCTA's StationLink Route 462 provides service between SARTC and the Civic Center between 6:00 a.m. and 9:00 a.m. in the morning and between 3:44 p.m. and 5:30 p.m. in the afternoon. StationLink buses are scheduled to meet selected Metrolink and Amtrak trains and Greyhound buses. There is no StationLink buses midday or weekend service. This is the only currently available east-west transit service through the Study Area.

Based on forecast information from OCTAM, in 2035 approximately 53 percent of trips (approximately 432,000 daily trips) to/from the Study Area will be within convenient reach of Metrolink service (**Figure 1-7**). These trips represent a strong potential source of ridership for the proposed fixed guideway corridor, as well as an opportunity to attract additional riders to Metrolink by providing connectivity for Metrolink riders who walk to a station and ride the train to the Study Area. A reliable and user-friendly transit connection between SARTC and key activity centers within the Study Area, including Downtown Santa Ana and the Civic Center would serve this potential travel market and further encourage the use of Metrolink by regional commuters to/from Santa Ana. The proposed fixed guideway corridor would provide the linkage between SARTC (Metrolink station) and Metrolink riders' destination in the Study Area.

Frequent and Reliable Circulation within the Study Area

The existing transportation system lacks alternatives to the automobile to connect Study Area neighborhoods with activity centers that provide employment and educational opportunities, goods and services. There is also a need to connect employees who commute to work in the Study Area with restaurants, retail, and services they require during the workday without the use of an automobile.

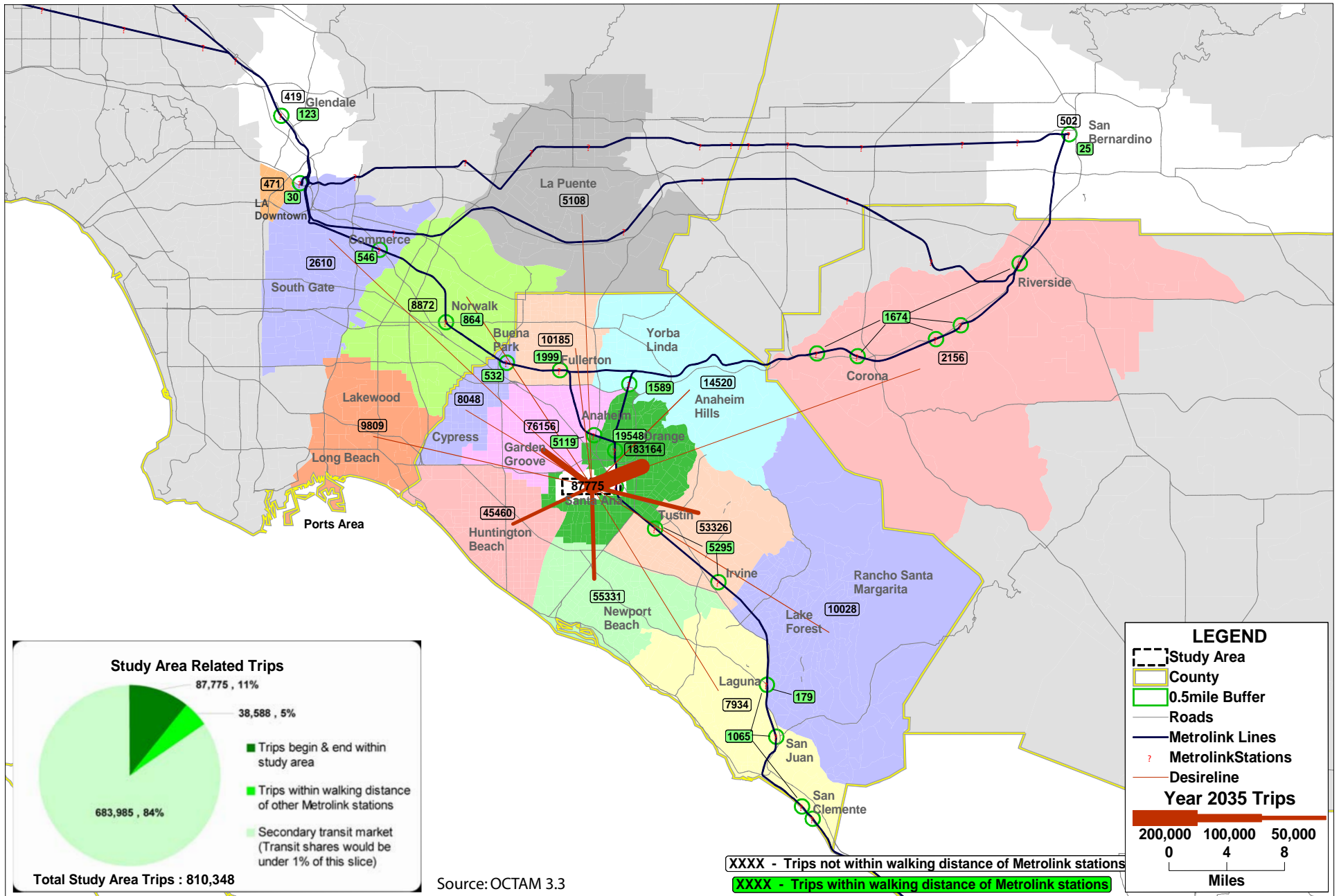
The StationLink service that OCTA provides between SARTC and the Civic Center area during the morning and evening peak travel periods does not serve the residential areas east and west of the Civic Center. Also, there is no early morning, mid-day, or late evening transit connection between SARTC and the Civic Center area.

Based on forecast information from OCTAM, in 2035, approximately 11 percent of Study Area trips (87,775 daily trips) begin and end in the Study Area. An additional 23 percent, or

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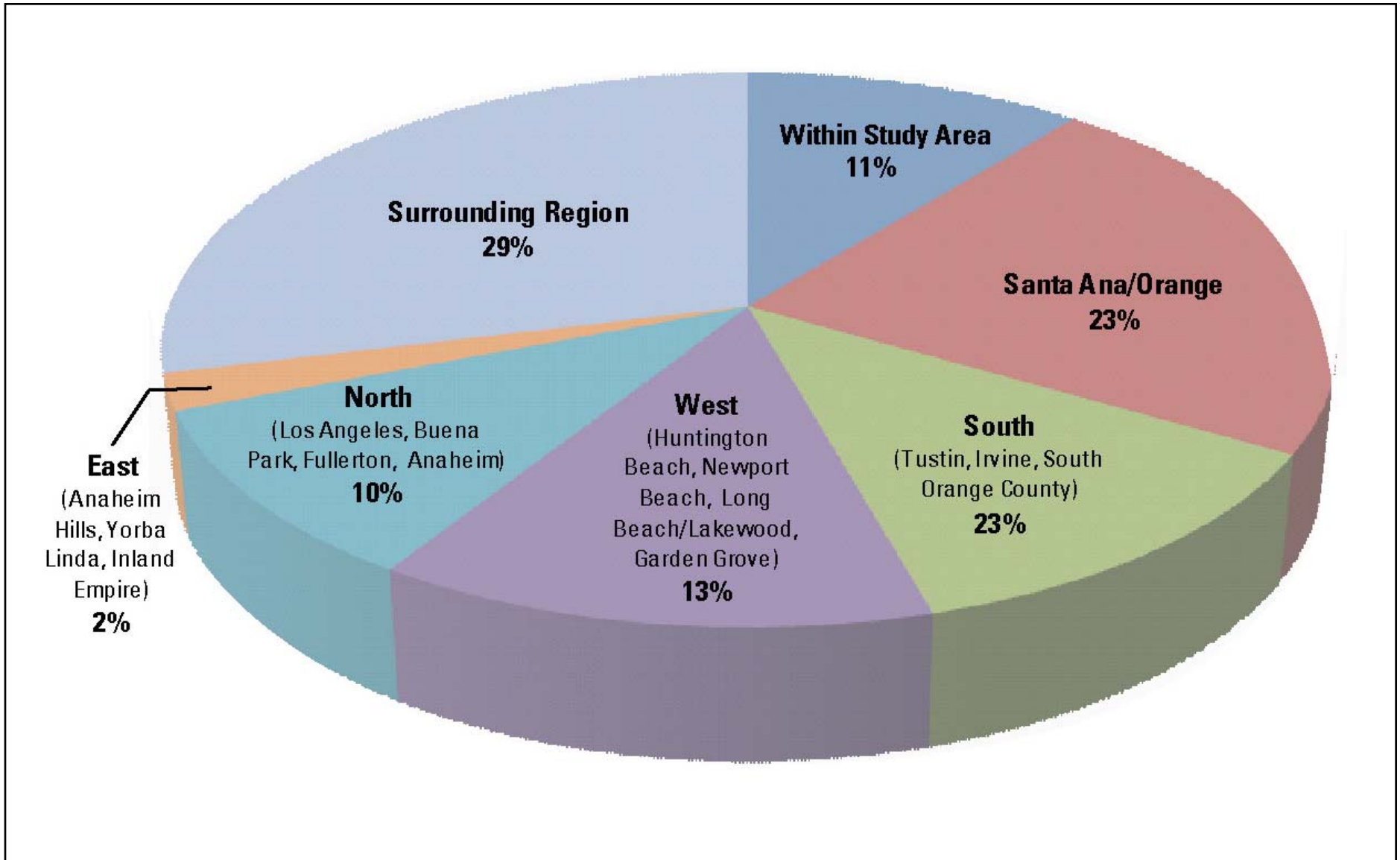


2035 Daily Study Area Trips To/From Key Regional Subareas



NOTE: All Trips Summary (HBW + Other trips purposes combined)

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Source: OCTAM 3.3

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183,164 daily trips, begin or end in the immediately surrounding area (the balance of Santa Ana south and east of the Study Area, and the City of Orange) (Figure 1-7). These trips represent both work and non-work related travel. The neighborhoods to the east of Downtown Santa Ana are well-covered by transit routes; although, not necessarily well served. Rather than enhancing connectivity between neighborhood activity centers, transit routes through this area are focused on connecting commuters with destinations in the Downtown and the Civic Center. West of Downtown, transit service is limited to local bus service along the major arterials, on a one-mile grid.

There are few convenient travel choices for employees within the Civic Center. Employees that need to go to lunch or run errands tend to use an automobile. The need for automobile use during work hours is a deterrent to using transit for the work commute and typically results in employees traveling to areas outside the Civic Center/Downtown area when eating or conducting personal business during the work day. Employees within the Civic Center could take advantage of the goods and services available within Downtown Santa Ana without the use of their automobiles.

Connecting Non-Study Area Residents with SARTC and Other Study Area Activity Centers

For many residents of central Orange County, SARTC provides the closest and most convenient access to regional, interregional, and interstate rail and bus services. Their options to access SARTC are limited to either personal autos or local bus service.

For residents of the communities west of the Civic Center, access to the Civic Center, Downtown, or SARTC requires travel along SR 22 or SR 55, and negotiating the I-5/SR 55 interchange or the Orange Crush (SR 22/I-5/SR 57 interchange); ranked the thirteenth worst physical bottleneck in the United States.¹¹ The alternate routes involve lengthy travel on congested arterials, or negotiating multiple transfers on local buses. There is a need to provide more direct access to the Civic Center, Downtown, and SARTC, as well as more travel choices for travelers originating west of the Civic Center. Based on forecast information from OCTAM, in 2035, approximately 13 percent (108,320 daily trips) of trips to/from the Study Area come from west of the Study Area (Figure 1-7) and represent a potential travel market which would be served by the proposed fixed guideway corridor at its western terminus at Harbor Boulevard.

Similar to Orange County's historic downtowns, Downtown Santa Ana is not directly accessible by freeways or regional arterials. First Street and Main Street, providing direct continuous regional arterial access to the Downtown Santa Ana and Civic Center areas, are four-lane arterials that carry traffic in excess of their capacity and are frequently congested with peak period commute traffic and midday traffic. Downtown Santa Ana's economic vitality has been inhibited by its constrained regional accessibility.

1.8 Statement of Purpose and Need

Table 1-1 summarizes the transportation problems (Needs) in the Study Area and the transportation solutions the proposed project would offer to address those problems (Purpose).

¹¹ Unclogging America's Arteries: Effective Relief for Highway Bottlenecks, American Highway Users Alliance, February 2004

1.9 Additional Project Goals

Support Local Plans for Transit-Oriented Development. The Cities of Santa Ana and Garden Grove recognize that land use, economic opportunity, and transportation planning go hand in hand. Over the last several years, the City of Santa Ana has implemented transit-oriented development in the area adjacent to SARTC. Santa Ana’s Transit Zoning Code, which encompasses 450 acres within the Study Area, supports mixed-use development and provides a transit-supportive, pedestrian-oriented development framework to reduce vehicle trips and greenhouse gas emissions.

TABLE 1-1: PROJECT PURPOSE AND NEED	
Needs (Transportation Problems)	Purpose (Transportation Solutions)
<p>Missing Transit Links. Every day, people travel to jobs or to government and judicial services in the Civic Center; or travel every day to employment and educational opportunities, goods and services available in the Study Area. Residents in the eastern part of the Study Area have limited access to local bus transit; those on the west have no direct service. In addition, people who commute from the surrounding region to SARTC via Metrolink, Amtrak or bus lines have limited options to reach their destinations.</p>	<p>Improve Transit Connectivity within the Study Area. There is a need for a local collector-distributor transit line that enhances access to employment, social services, education and other opportunities available within the Study Area for the residents of the community. Improved transit connectivity will also reinforce the viability of transit for workers commuting to the Civic Center via Metrolink, Amtrak and bus lines from the surrounding region.</p>
<p>Congested Freeways and Arterials. All of the freeways serving the Study Area (I-5, SR 55, SR 22 and SR 57) are subject to congestion during peak periods; the segments of I-5 and SR 55 adjacent to the Study Area carry peak hour volumes in excess of 110 percent of capacity. Likewise, the major arterials that serve the Study Area carry traffic in excess of their capacity with daily levels of service of E or worse, and are frequently congested with peak period and midday traffic.</p>	<p>Relieve Congestion by Providing Alternative Mobility Options. A local collector-distributor transit line connecting SARTC with Downtown, the Civic Center and the Harbor Boulevard corridor to the west will reinforce the viability of transit for workers and residents in central Santa Ana. Increased transit use in this area has the potential to reduce travel along the I-5, SR-22 and through the congested “Orange Crush interchange area. It will also provide potential benefit to the Study Area arterial system that links the key activity centers.</p>
<p>Limited Transportation Improvement Options. Due to its built-out condition and the potential environmental impacts that would result from freeway and arterial widening projects, few options are available to increase roadway capacity or implement transit systems that require additional rights-of-way within the Study Area. Opportunities to improve mobility are limited to TSM and Transportation Demand Management (TDM) strategies, and increased/enhanced transit service.</p>	<p>Be Sensitive to the Character of the Community. Since many of the roadways that serve the Study Area are narrow, and historic buildings line the sidewalks of many streets, the cities’ are committed to identifying transit improvements that can be accommodated within the existing street system and rights-of-way without extensive street widening to avoid impacts to adjacent land uses and to the existing character of the community.</p> <p>Transportation solutions will need to be good neighbors to residents (quiet), pedestrian-friendly and operate substantially within the existing street system using available rights-of-way. The scale, fit and operating characteristics of the transportation investment will need to be compatible with the established urban setting, and incorporate principles of context sensitive design.</p>

TABLE 1-1: PROJECT PURPOSE AND NEED

Needs (Transportation Problems)	Purpose (Transportation Solutions)
<p>Limited Travel Choices. With tree-lined sidewalks along two lane streets, and churches and schools intermingled within the neighborhoods, there is already considerable pedestrian activity. Although residents are able to walk to many key destinations within their neighborhoods, other local opportunities for shopping, employment and/or personal services are just out of reach for walking.</p> <p>For those who work within the Study Area or travel there for other purposes, such as jury duty, restaurants and retail opportunities cannot be conveniently accessed on foot during lunch hour.</p> <p>While OCTA fixed route bus service connects the Study Area to the surrounding region, east-west service within the Study Area is limited. Residents in the eastern part of the Study Area have limited access to local bus transit; those on the west have no direct service, leaving the automobile as their only travel option.</p>	<p>Increase Transportation Options. Providing a transit alternative for short, local trips within the Study Area will provide residents a practical means to complete necessary trips related to daily living while reinforcing the walkable character of this community.</p> <p>A local circulator will benefit employees and visitors to the Downtown and Civic Center areas and also the businesses located there by efficiently connecting potential customers with shops, restaurants and services that are not quite accessible by walking or without an automobile</p>
<p>Significant Level of Transit Dependence. The median household income of the Study Area is \$28,167, which is slightly above the U.S. poverty level (\$25,596 for a five-person household). Approximately 17.8 percent of the households within the Study Area do not have any residents who own an automobile. Approximately 31.9 percent of the residents in the Study Area are under the age of 15 and therefore, not yet eligible to drive an automobile.</p> <p>These characteristics contribute to high levels of transit dependency within the Study Area, creating a potentially large transit market.</p>	<p>Improve Transit Accessibility to and within the Study Area. Improved transit accessibility to and within the Study Area will enhance the quality of life for the large number of transit-dependent individuals who live in the Study Area by providing them greater access to employment, social services, shopping, education, and other opportunities within the Study Area. It will also enable transit-dependent people who live in other parts of Orange County to more easily access federal, state and county social service agencies which are concentrated in the Civic Center area.</p>
<p>Automobile Emissions Contribute to Unhealthy Air Quality. The Study Area lies within the South Coast Air Basin (Basin). Air quality within the Basin is governed by the standards established by the U.S. Environmental Protection Agency (USEPA) and the more stringent requirements of the California Air Resources Board (CARB), and managed by the South Coast Air Quality Management District (SCAQMD). Based on the standards established by CARB, the Basin is currently designated as a non-attainment area for ozone and total suspended particulates. Mobile source emissions are identified by SCAQMD as the single largest contributor to the region’s air quality problems. This includes greenhouse gases associated with cars, light-duty trucks and medium-duty passenger vehicles. On January 10, 2010, the Administrator of the USEPA enacted a rule finding that greenhouse gases in the atmosphere may reasonably be anticipated to endanger both public health and public welfare. The predominance of the automobile as the primary mode of travel within the Study Area and the surrounding region contributes to reduced air quality. There is a need to reduce health effects associated with air quality emissions by reducing vehicle miles traveled.</p>	<p>Provide Benefits to the Environment through Improved Air Quality. An important goal of the SA-GG Fixed Guideway Project is to help reduce reliance on the automobile and to take active steps to improve air quality in the Study Area. This calls for transit solutions that allow those who commute to the Study Area via Metrolink and Amtrak to complete their trips without the use of a car. This also calls for transit options that would serve the circulation needs of residents, employees, and visitors so that they do not have to rely on their private automobiles to complete these trips within the Study Area. An additional criterion for alternatives development is that clean fuel technologies, such as electricity, liquefied natural gas or clean diesel would need to be used to power the transit vehicles.</p>

Support Economic Vitality and Foster Redevelopment Opportunities. The Cities of Santa Ana and Garden Grove recognize the importance of public investment in infrastructure as a catalyst for economic development. In the competitive Orange County marketplace, transportation infrastructure projects that improve access and mobility enhance the attractiveness of neighborhoods and provide a competitive edge for nearby businesses. Therefore, an important element of the Cities' integrated transportation-land use vision is the provision of transit service that is continuous and reliable, as well as a permanent and visible fixture for transit users and the community. Such service would improve visibility and access to existing economic activity centers and areas targeted for redevelopment. Connectivity to these key existing and future development areas is one of the most critical aspects of the SA-GG Fixed Guideway Project.

In recent years, the City of Santa Ana has taken active steps to revitalize its downtown area to attract new businesses, customers, and visitors, utilizing a design scheme that fosters walkability and transit use. The Artist's Village and the East End Promenade in Downtown Santa Ana are prime examples of this effort. Moreover, the recent adoption of the Transit Zoning Code by the City of Santa Ana provides the policy foundation for redevelopment activities specifically targeted to the SA-GG Fixed Guideway Project. However, constrained access continues to be a challenge for the area.

To the west, the City of Garden Grove continues to promote economic development along the Harbor Boulevard Corridor (International West). The proposed transportation investment is intended to support economic vitality and foster redevelopment opportunities within the Study Area by improving access and connectivity within the Study Area, and between the Study Area and the surrounding region. This, in turn, will improve visibility and enhance access to Study Area land uses, and promote businesses. It will strengthen existing development and foster new opportunities for mixed-use development and transit-supportive residential products, and regionally significant resort and entertainment venues in areas such as the Willowick Public Golf Course and the southern end of Harbor Boulevard Corridor.

Be Financially Feasible and Cost Efficient to Construct, Operate and Maintain. A practical consideration in the development of alternatives for the SA-GG Fixed Guideway Corridor is that potential transit solutions shall be affordable. While at this early stage in the study there is no set, minimum, threshold for affordability, the capital costs needed to construct the project and the expense of operating and maintaining the system need to be reasonable and achievable based on known, potential revenue sources for project funding. At present, this is envisioned to be a mix of local, State, and federal transportation funds. Opportunities for public/private partnerships and private involvement/profit sharing within the vicinity of station stop areas are also being explored as additional potential funding sources.

Santa Ana's overall vision for the Study Area includes a transit system that integrates seamlessly with the community and is compatible with the established urban character.

Chapter 2.0 Alternatives

The alternatives addressed in this EA/DEIR consist of a No Build Alternative, which is used as a basis for comparing the costs and benefits of the three alternatives –TSM, Streetcar 1 and Streetcar 2, each of which responds to purpose and need, study goals, and community input.

The EA/DEIR considers the environmental effects and impacts of three potential alternatives which would operate entirely or substantially in mixed-flow traffic within the existing urban street setting:

1. TSM Alternative which would provide increased transit operations and service levels along roadways within the Study Area which currently support fixed route bus transit.
2. Streetcar Alternative 1 which would utilize the PE ROW through the western half of its alignment and generally operate along Santa Ana Boulevard and 4th Street along the eastern half of the alignment to SARTC.
3. Streetcar Alternative 2 which would utilize the PE ROW through the western half of its alignment and substantially operate along Santa Ana Boulevard, Civic Center Drive, and 5th Street along the eastern half of the alignment to SARTC.

Additional details are provided below. The AA contains a more detailed description of the initial screening process and is available under separate cover at the City of Santa Ana Ross Annex or online at <http://www.ci.santa-ana.ca.us/transitvision>.

2.1 No Build Alternative

The No Build Alternative includes existing conditions, as well as conditions that would be reasonably expected to occur in the foreseeable future without implementation of any of the build alternatives. The No Build Alternative provides the basis for comparing future conditions resulting from other alternatives. Conditions in the foreseeable future (through planning horizon year 2035) include projects that (1) have environmental analysis approved by an implementing agency and (2) have a funding source identified for implementation.

Other projects in the foreseeable future include:

- Implementation of the Transit Zoning Code (SD 84A and SD 84B), both project-level and program-level components, that are anticipated for build-out by 2028
- Implementation of the Station District Development Projects, which consist of a variety of residential develop projects, community open space and some limited neighborhood-serving commercial development
- Transit improvements including modest adjustments to existing local bus routes; and expanded Metrolink service
- Three, new bus rapid transit routes: (1) Harbor Boulevard Bus Rapid Transit Corridor [Costa Mesa to Fullerton, 10-minute headways, peak period]; (2) Westminster/17th Street Bus Rapid Transit Corridor [Santa Ana to Long Beach, 10-minute headways, peak period]; and (3) Bristol Street Bus Rapid Transit Corridor [Irvine Transportation Center to Brea Mall, 10-minute headways, peak period]

- Roadway improvements including the Bristol Street Widening project, which will widen Bristol Street from four to six lanes between Warner Avenue and Memory Lane, and the Grand Avenue Widening project, which will widen Grand Avenue from four to six lanes between 1st Street and 17th Street

2.2 TSM Alternative

The TSM Alternative enhances the mobility of existing transportation facilities and transit network without construction of major new transportation facilities or significantly, costly physical capacity improvements. Consistent with FTA guidelines, the TSM Alternative emphasizes low cost (i.e., small physical) improvements and operational efficiencies such as focused traffic engineering actions, expanded bus service, and improved access to transit services. Included within the TSM Alternative are modifications and enhancements to selected bus routes in the Study Area including:

- Skip-stop overlay service on 1st Street (Route 64) which includes access to SARTC
- A new route between SARTC and Harbor Boulevard/Westminster Avenue via Civic Center Drive, Bristol Street and 17th Street/Westminster Avenue, providing 10-minute peak and 20-minute off-peak service
- Expanded service span for StationLink service (Route 462) between SARTC and the Civic Center, providing 15-minute service during both peak and off-peak hours.

Figure 2-1 is a map of the proposed routes for the TSM bus network enhancements.

In addition, the following system operational improvements are included in the TSM Alternative:

- Traffic signal timing improvements at select congested locations along Santa Ana Boulevard and Civic Center Drive to provide for enhanced east-west bus flow, potential including but not limited to:
 - Main Street at Civic Center Drive
 - Broadway at Civic Center Drive
 - Flower Street at Civic Center Drive
 - Fairview Street at Civic Center Drive
 - Santa Ana Boulevard at Santiago Street
 - Santa Ana Boulevard at Lacy Street (install traffic signal)
- Real-time bus schedule information at high-volume transit stops (e.g., Flower Street and 6th Street, Santa Ana Boulevard and Main Street)
- Improvements to transit stop amenities (benches, shelters, kiosks, sidewalk connections, etc.) along the Santa Ana Boulevard and Main Street corridors
- Improvements to bicycle and pedestrian circulation to promote safe, convenient and attractive connectivity between the transit system and surrounding neighborhoods and activity centers , including accommodating bicycles on all buses, providing real time bus arrival information via internet and mobile devices, installing bicycle storage facilities at SARTC and the Harbor/Westminster stop, and providing study area maps/walking guides on all buses

2.3 Streetcar Alternative 1

Streetcar Alternative 1 would utilize the PE ROW through the western half of its alignment and generally operate along Santa Ana Boulevard and 4th Street on the way to SARTC. The 4.2-mile alignment for Streetcar Alternative 1 would include 12 stations. It is anticipated that the streetcar system would operate seven days a week with 10-minute headways during peak periods and 15-minute headways during off-peak periods. The streetcars would be electrically powered using an overhead contact system and a series of TPSS located intermittently along the alignment. Although the specific vehicle has not been selected at this preliminary stage, streetcars generally have a capacity of 30 to 40 seated passengers and 80 to 90 standing passengers for a total of 120 to 130 passengers. **Table 2-1** provides a summary description of the key physical and operational attributes of Streetcar Alternative 1 (PE ROW with Santa Ana Boulevard and 4th Street Couplet). **Figure 2-2** provides a conceptual illustration of the alignment for Streetcar Alternative 1 relative to the existing street network within the Study Area.

2.3.1 Sasser Park Alignment

In Streetcar Alternative 1, the Downtown Santa Ana segment features couplet operations with the westbound streetcar alignment on Santa Ana Boulevard and the eastbound streetcar alignment on 4th Street. For the eastbound transition from Santa Ana Boulevard to 4th Street, a direct route from Santa Ana Boulevard along a public easement on the southern edge of Sasser Park to 4th Street has been identified in **Figure 2-3**.

2.4 Streetcar Alternative 2

Streetcar Alternative 2 would utilize the PE ROW through the western half of its alignment and substantially operate along Santa Ana Boulevard, Civic Center Drive, and 5th Street along the eastern half of the alignment to SARTC. The operational characteristic of this alternative are identical to Streetcar Alternative 1. The differences between the two streetcar alternatives are the alignment and the fact that Streetcar 2 would have one additional station for a total of 13. **Table 2-2** provides a summary description of the key physical and operational attributes of Streetcar Alternative 2 (PE ROW with Santa Ana Boulevard and 5th Street/Civic Center Drive Couplet). This table also includes station locations for comparison to station locations for Streetcar Alternative 1 shown in Table 2-1, above. **Figure 2-4** provides a conceptual illustration of the alignment for Streetcar Alternative 2 relative to the existing street network within the Study Area.

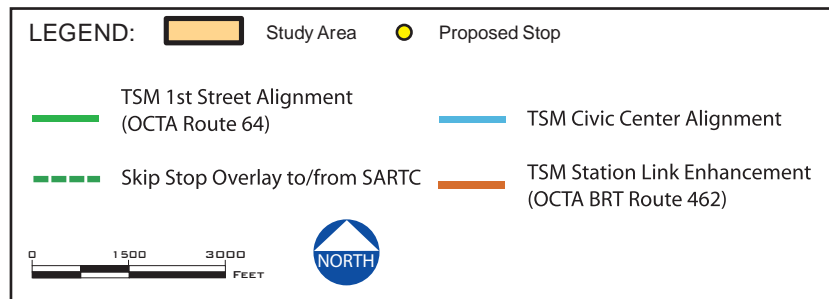
2.4.1 Civic Center Bike Lane

The Streetcar Alternative 2 alignment travels westbound through the Civic Center along Civic Center Drive between Spurgeon and Flower Streets. As part of the City of Santa Ana's Complete Streets Program, and not as part of the SA-GG Fixed Guideway, the City plans to construct bicycle lanes along Civic Center Drive. Streetcar Alternative 2 would acquire additional ROW (**Figure 2-5**) in order not to preclude the westbound bike lane.

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Transportation Systems Management (TSM) Alternative



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TABLE 2-1: KEY PHYSICAL AND OPERATIONAL ATTRIBUTES OF STREETCAR ALTERNATIVE 1

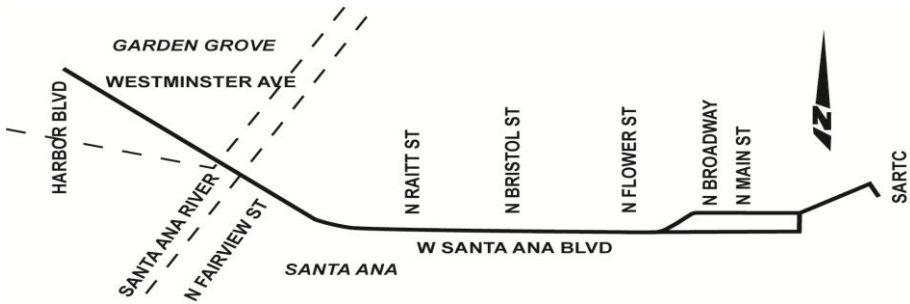
Key Attributes	Descriptions			
Transmit Mode	Streetcar			
Termini	Western Terminus: Harbor Blvd. Eastern Terminus: SARTC			
Alignment Description	<p><u>Routing by Segment:</u></p> <ul style="list-style-type: none"> • PE ROW, from Harbor Blvd. to Raitt St.: streetcars operate at-grade, bi-directionally, in exclusive ROW. • Santa Ana Blvd., from Raitt St. to Ross St.: streetcars operate in the street, at-grade, bi-directionally, along with mixed-flow traffic. • 4th St./Santa Ana Blvd. Couplet, from Ross St. to Mortimer St.: streetcars operate in the street, at-grade, one-way, along with mixed-flow traffic. • Santa Ana Blvd., from Mortimer St. to SARTC: streetcars operate in the street, at-grade, bi-directionally, along with mixed-flow traffic. 			
Length of Alignment	4.1 miles (Harbor Blvd. to SARTC)			
Stations (12 Stations)	<p><u>Station Locations:</u></p> <ol style="list-style-type: none"> 1. Harbor Blvd. and Westminister Ave. 2. Willowick 3. Fairview St. and PE ROW 4. Raitt St. and Santa Ana Blvd. 5. Bristol St. and Santa Ana Blvd. 6. Flower St. and Santa Ana Blvd. <table border="1"> <tr> <td> <p><i>Couplet Section (Eastbound)</i></p> <ol style="list-style-type: none"> 7E. Sasscer Park 8E. Broadway and 4th St. 9E. Main St. and 4th St. 10E. French St. and 4th St. </td> <td> <p><i>Couplet Section (Westbound)</i></p> <ol style="list-style-type: none"> 7W. Ross St. and Santa Ana Blvd. 8W. Broadway and Santa Ana Blvd. 9W. Main St. and Santa Ana Blvd. 10W. French St. and Santa Ana Blvd. </td> </tr> </table> <ol style="list-style-type: none"> 11. Lacy St. and Santa Ana Blvd. 12. SARTC 		<p><i>Couplet Section (Eastbound)</i></p> <ol style="list-style-type: none"> 7E. Sasscer Park 8E. Broadway and 4th St. 9E. Main St. and 4th St. 10E. French St. and 4th St. 	<p><i>Couplet Section (Westbound)</i></p> <ol style="list-style-type: none"> 7W. Ross St. and Santa Ana Blvd. 8W. Broadway and Santa Ana Blvd. 9W. Main St. and Santa Ana Blvd. 10W. French St. and Santa Ana Blvd.
<p><i>Couplet Section (Eastbound)</i></p> <ol style="list-style-type: none"> 7E. Sasscer Park 8E. Broadway and 4th St. 9E. Main St. and 4th St. 10E. French St. and 4th St. 	<p><i>Couplet Section (Westbound)</i></p> <ol style="list-style-type: none"> 7W. Ross St. and Santa Ana Blvd. 8W. Broadway and Santa Ana Blvd. 9W. Main St. and Santa Ana Blvd. 10W. French St. and Santa Ana Blvd. 			
Design Options Carried Forward	<p>Santa Ana River Crossing:</p> <ul style="list-style-type: none"> • Adjacent Single Track Bridge Option 			

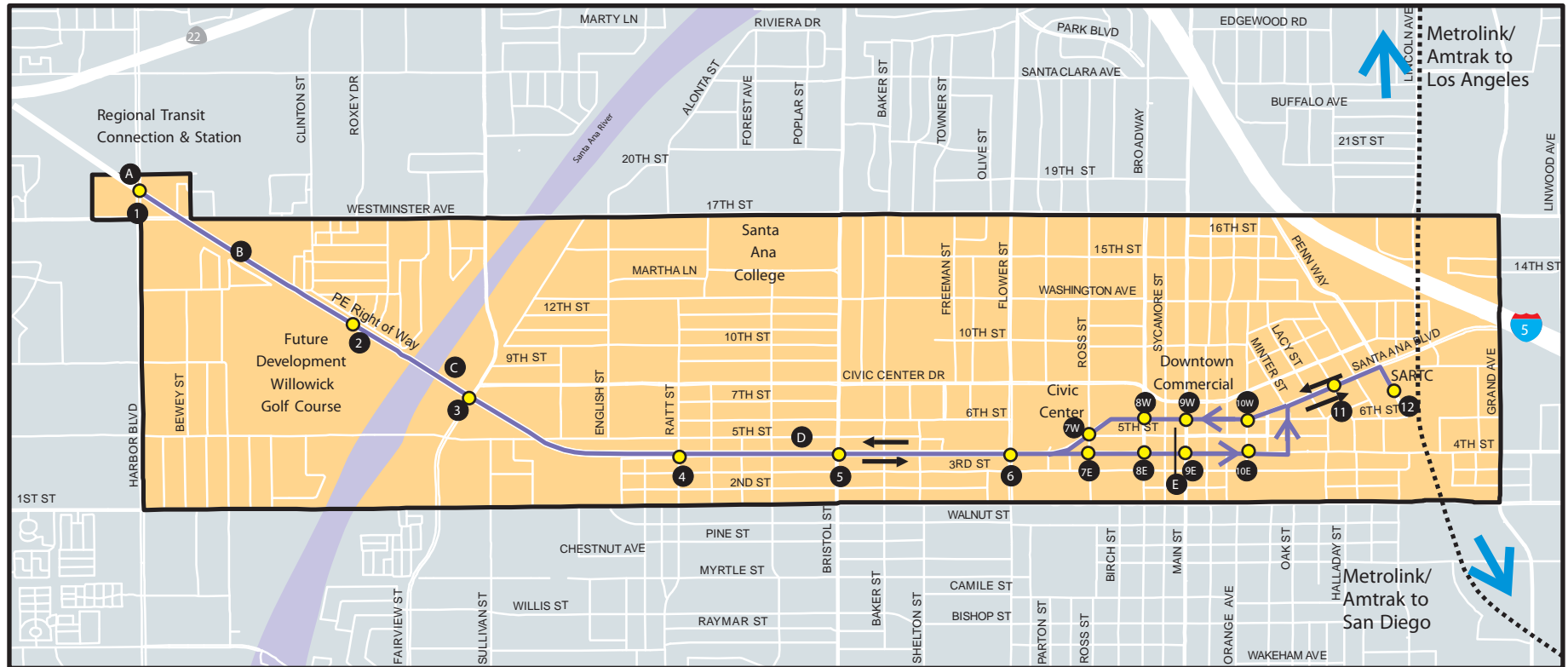
TABLE 2-1: KEY PHYSICAL AND OPERATIONAL ATTRIBUTES OF STREETCAR ALTERNATIVE 1

Key Attributes	Descriptions
	4 th Street Parking Scenarios: <ul style="list-style-type: none"> • Scenario A: South side parallel • Scenario B: South side removal • Scenario C: South side and north side removal
Headways	Peak: 10 minutes (6:00 a.m. to 6:00 p.m.) Off-Peak: 15 minutes (after 6:00 p.m.)
Hours of Operation (in revenue service)	Monday – Thursday: 6:00 a.m. to 11:00 p.m. (17 hours) Friday and Saturday: 6:00 a.m. to 1:00 a.m. (19 hours) Sunday: 7:00 a.m. to 10:00 p.m. (15 hours)
Transit Vehicle	Streetcar – Vehicle type selection has yet to be determined. The two classifications under consideration include: <ul style="list-style-type: none"> • Classic Modern Streetcar (e.g., Portland, Oregon) • CPUC Compliant Streetcar (e.g., San Diego, California)
Power Source	Electric, Overhead Contact System, Traction Power Substations (TPSS) <u>TPSS Locations:</u> <ol style="list-style-type: none"> a. Northwest of Harbor Boulevard and Westminster Avenue b. Along PE ROW, west of Susan Street c. Along PE ROW, east of Santa Ana River d. North on Santa Ana Boulevard. East of Bristol Street e. North of 5th Street, east of Main Street
Operations and Maintenance Facility Sites	Two Candidate Sites: <ul style="list-style-type: none"> • Site A: South of SARTC, bordered by 4th St., 6th St., Poinsettia St., and Metrolink tracks. • Site B: West of Raitt St., between the PE ROW and 5th Street
Major Bicycle and Pedestrian Features	<ul style="list-style-type: none"> • Sidewalk and pedestrian improvements in the vicinity of proposed station platforms. • 4th St.: In conjunction with on-street parking modifications, widen sidewalks on 4th St. between Ross St. and French St.: <ul style="list-style-type: none"> – Scenario A: On south side by 8 ft. for a total width of 20 ft. – Scenario B: On south side by 16 ft. for a total width of 28 ft. – Scenario C: On both sides by 16 ft. for a total width of 28 ft.

Source: Cordoba Corporation, Conceptual Design Plan Set, October 2012.



Streetcar Alternative 1 Alignment



LEGEND:

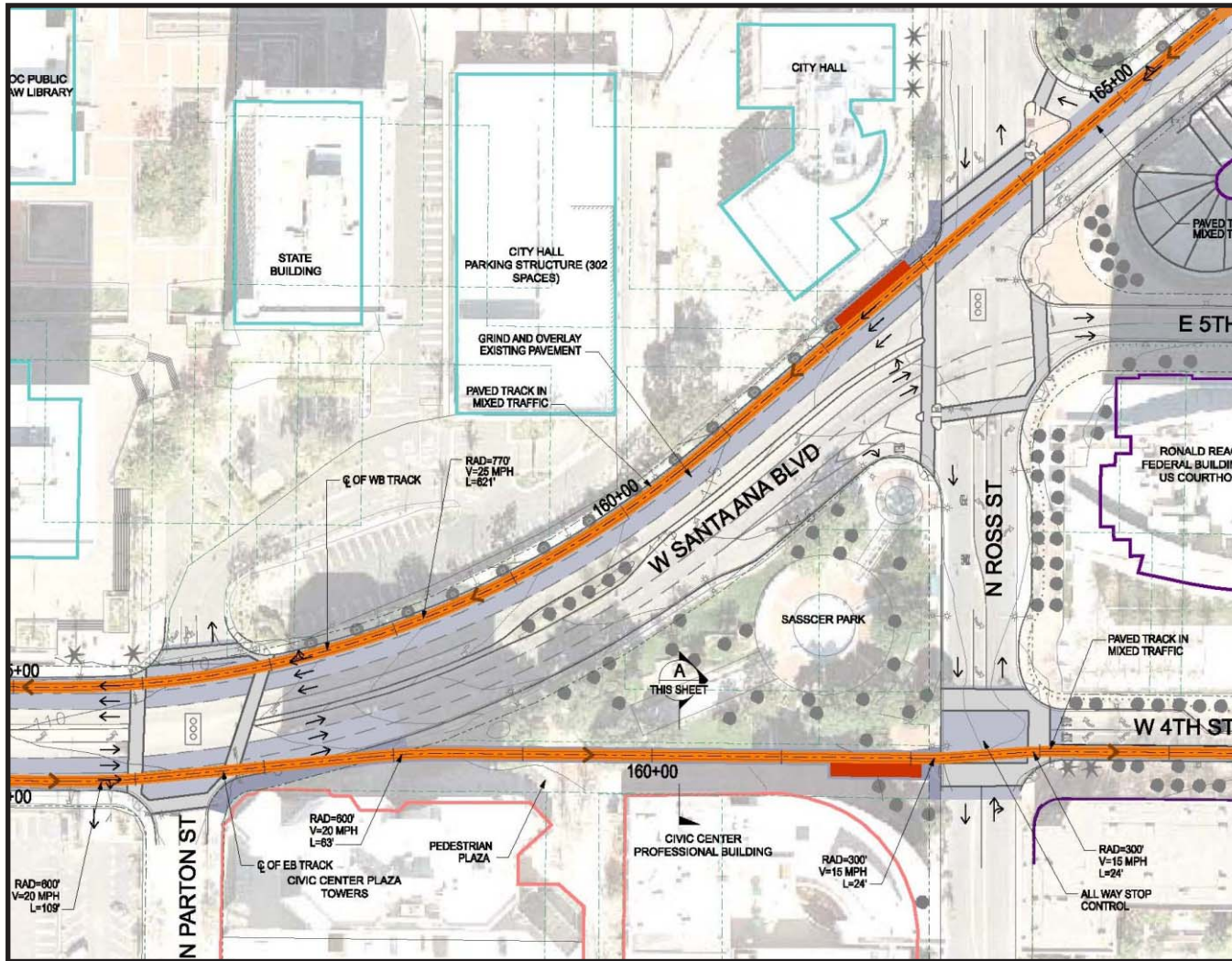
- Study Area
- Proposed Stop
- Streetcar Alternative 1
- Station Name
- TPSS

0 1500 3000 FEET

Source: Cordoba Corporation, *Draft Alternatives Analysis Report for the Santa Ana-Garden Grove Fixed Guideway Corridor Study*, April, 2014.

Note: Termini for Initial Operable Segment 1 (IOS-1) are located at Raitt Street and SARTC.

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Source: Cordoba Corporation, *Draft Alternatives Analysis Report for the Santa Ana-Garden Grove Fixed Guideway Corridor Study*, April, 2014.

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TABLE 2-2: KEY PHYSICAL AND OPERATIONAL ATTRIBUTES OF STREETCAR ALTERNATIVE 2

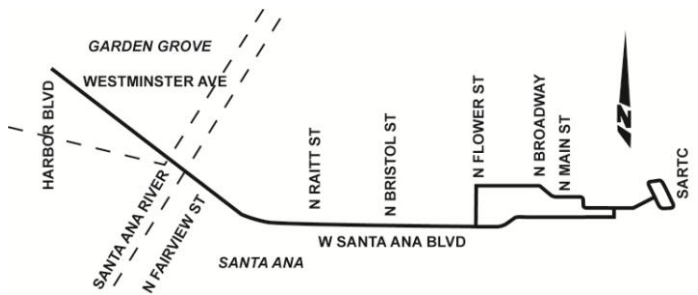
Key Attributes	Descriptions			
Transit Mode	Streetcar			
Termini	Western Terminus: Harbor Blvd. Eastern Terminus: SARTC			
Alignment Description	<p><u>Routing by Segment:</u></p> <ul style="list-style-type: none"> • PE ROW, from Harbor Blvd. to Raitt St.: streetcars operate at-grade, bi-directionally, in exclusive ROW. • Santa Ana Blvd., from Raitt St. to Flower St.: streetcars operate in the street, at grade, bi-directionally, along with mixed-flow traffic. • Santa Ana Blvd./5th St. and Civic Center Dr. Couplet, from Flower St. to Minter St.: streetcars operate in the street, at-grade, one-way, along with mixed-flow traffic. • 6th St./Brown St., from Minter St. to Poinsettia St.: streetcars operate in the street, at-grade, bi-directionally, along with mixed-flow traffic. • Poinsettia St./Santa Ana Blvd./Santiago St./6th St. (SARTC Loop): streetcars operate in a one-way loop, in the street, at-grade, along with mixed-flow traffic. 			
Length of Alignment	4.5 miles (Harbor Boulevard to SARTC)			
Stations(13 Stations)	<p><u>Station Locations:</u></p> <ol style="list-style-type: none"> 1. Harbor Blvd. and Westminister Ave. 2. Willowick 3. Fairview St. and PE ROW 4. Raitt St. and Santa Ana Blvd. 5. Bristol St. and Santa Ana Blvd. <table border="1"> <tr> <td> <p><i>Couplet Section(Eastbound)</i></p> <ol style="list-style-type: none"> 6E. Flower St. and Santa Ana Blvd. 7E. ----- 8E. Ross St. and Santa Ana Blvd. 9E. Broadway and 5th St. 10E. Main St. and 5th St. 11E. French St. and 5th St. </td> <td> <p><i>Couplet Section(Westbound)</i></p> <ol style="list-style-type: none"> 6W. Flower St. and 6th St. 7W. Flower St. and Civic Center Dr. 8W. Van Ness Ave. and Civic Center Dr. 9W. Broadway and Civic Center Dr. 10W. Main St. and Civic Center Dr. 11W. French St. and Santa Ana Blvd. </td> </tr> </table> <ol style="list-style-type: none"> 12. Brown St. and Lacy St. 13. SARTC 		<p><i>Couplet Section(Eastbound)</i></p> <ol style="list-style-type: none"> 6E. Flower St. and Santa Ana Blvd. 7E. ----- 8E. Ross St. and Santa Ana Blvd. 9E. Broadway and 5th St. 10E. Main St. and 5th St. 11E. French St. and 5th St. 	<p><i>Couplet Section(Westbound)</i></p> <ol style="list-style-type: none"> 6W. Flower St. and 6th St. 7W. Flower St. and Civic Center Dr. 8W. Van Ness Ave. and Civic Center Dr. 9W. Broadway and Civic Center Dr. 10W. Main St. and Civic Center Dr. 11W. French St. and Santa Ana Blvd.
<p><i>Couplet Section(Eastbound)</i></p> <ol style="list-style-type: none"> 6E. Flower St. and Santa Ana Blvd. 7E. ----- 8E. Ross St. and Santa Ana Blvd. 9E. Broadway and 5th St. 10E. Main St. and 5th St. 11E. French St. and 5th St. 	<p><i>Couplet Section(Westbound)</i></p> <ol style="list-style-type: none"> 6W. Flower St. and 6th St. 7W. Flower St. and Civic Center Dr. 8W. Van Ness Ave. and Civic Center Dr. 9W. Broadway and Civic Center Dr. 10W. Main St. and Civic Center Dr. 11W. French St. and Santa Ana Blvd. 			

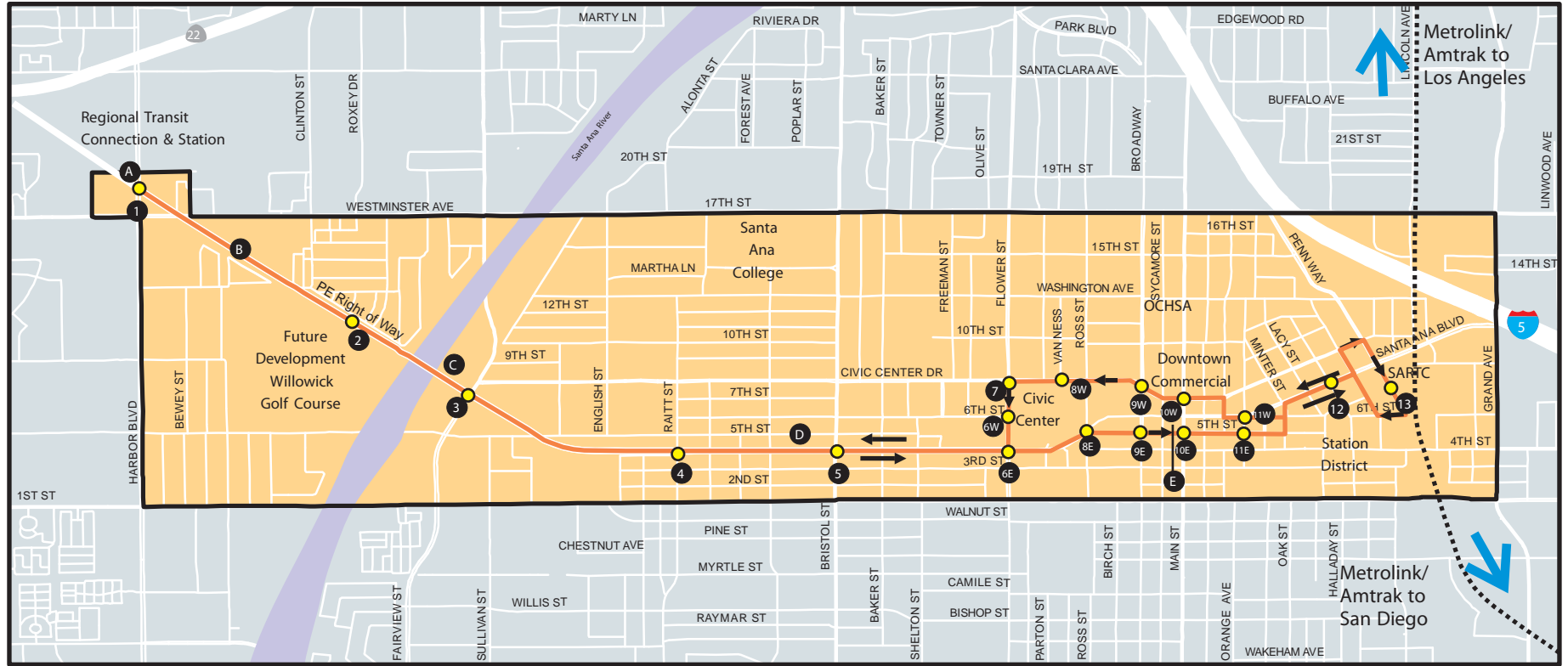
TABLE 2-2: KEY PHYSICAL AND OPERATIONAL ATTRIBUTES OF STREETCAR ALTERNATIVE 2

Key Attributes	Descriptions
Design Options Carried Forward	<u>Santa Ana River Crossing:</u> Adjacent Single Track Bridge
Headways	Peak: 10 minutes (6:00 a.m. to 6:00 p.m.) Off-Peak: 15 minutes (after 6:00 p.m.)
Hours of Operation (in revenue service)	Monday – Thursday: 6:00 a.m. to 11:00 p.m. (17 hours) Friday and Saturday: 6:00 a.m. to 1:00 a.m. (19 hours) Sunday: 7:00 a.m. to 10:00 p.m. (15 hours)
Transit Vehicle	Streetcar – Vehicle type selection has yet to be determined. The two classifications under consideration include: <ul style="list-style-type: none"> • Classic Modern Streetcar (e.g., Portland, Oregon) • CPUC Compliant Streetcar (e.g., San Diego, California)
Power Source	Electric, Overhead Contact System, Traction Power Substations(TPSS) <u>TPSS Locations:</u> <ol style="list-style-type: none"> a. Northwest of Harbor Boulevard and Westminster Avenue b. Along PE ROW, west of Susan Street c. Along PE ROW, east of Santa Ana River d. North on Santa Ana Boulevard, east of Bristol Street e. North of 5th Street, east of Main Street
Operations and Maintenance Facility Sites	Two Candidate Sites: <ul style="list-style-type: none"> • Site A: South of SARTC, bordered by 4th St., 6th St., Poinsettia St., and the Metrolink tracks. • Site B: West of Raitt St., between the PE ROW and 5th St.
Major Bicycle and Pedestrian Features	<ul style="list-style-type: none"> • Sidewalk and pedestrian improvements in the vicinity of proposed station platforms. • Civic Center Drive: Provide sufficient street width on Civic Center Drive between Flower Street and Spurgeon Street to support the City’s planned development of a striped bike lane on each side of the street.

Source: Cordoba Corporation, Conceptual Design Plan Set, October 2012.



Streetcar Alternative 2 Alignment



LEGEND:

- Study Area
- Proposed Stop
- Streetcar Alternative 2
- # Station Name
- X TPSS

0 1500 3000 FEET

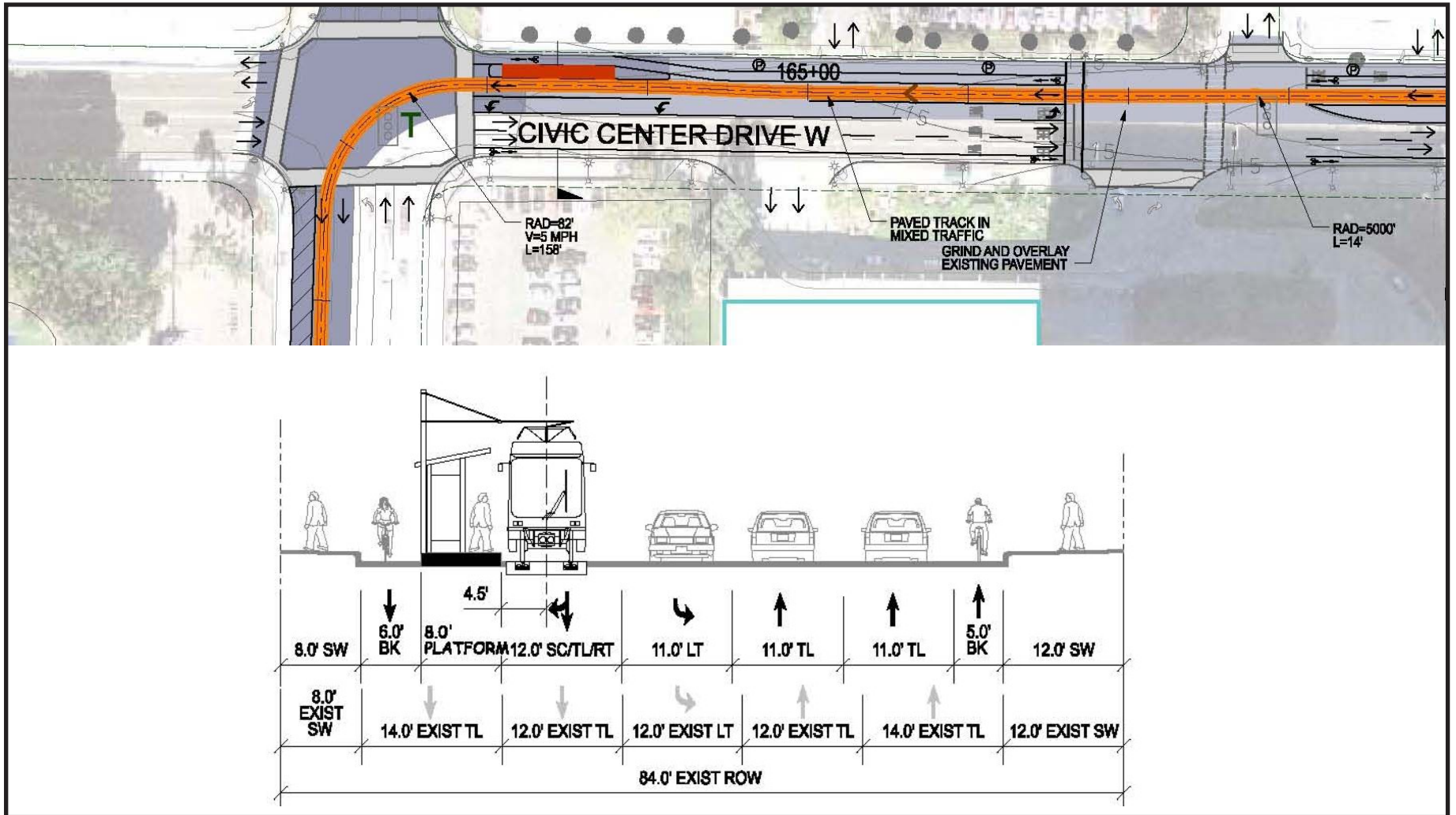
NORTH

Source: Cordoba Corporation, *Draft Alternatives Analysis Report for the Santa Ana-Garden Grove Fixed Guideway Corridor Study*, April, 2014.
 Note: Termini for Initial Operable Segment 2 (IOS-2) are located at Raitt Street and SARTC.

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Civic Center Drive Bike Lane



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2.5 Streetcar Alternatives Initial Operable Segments

In response to funding and phasing issues raised by fiscal constraints identified during OCTA's long-range transportation planning process, IOSs which are shorter segments of Streetcar Alternatives 1 and 2 were developed for the SA-GG Fixed Guideway Project. The intent of the IOSs was to identify starter segments that could be constructed and operated until funding is assembled to complete the projects. Both IOS-1 and IOS-2 would terminate at Raitt Station (Raitt Street and Santa Ana Boulevard) rather than Harbor Station (Harbor Boulevard and Westminster Avenue). Both would include the same project features and design options as their respective full alignment build alternatives between Raitt Street and SARTC. These tracks would extend another hundred feet west within the PE ROW to reach the O & M Facility Site B should this site ultimately be selected for either IOS-1 or IOS-2.

The configuration of Raitt as an interim terminus station is the same for IOS-1 and IOS-2. Just over 50 spaces would be provided for station parking at Raitt within the PE ROW on an interim basis to be replaced by parking at Harbor Station upon completion of the full Project. Vehicular access to Raitt Station parking would be via Daisy Avenue.

IOS-1 (Santa Ana Boulevard and 4th Street Couplet). IOS-1 follows the same alignment as Streetcar Alternative 1, but terminates at Raitt Station rather than extending to Harbor Station (**Figures 2-6 through 2-8**). The IOS-1 streetcar alignment is about 2.2 miles in length. IOS-1 includes the same project features, design options, and parking scenarios as Streetcar Alternative 1 between Raitt Street and SARTC (**Table 2-3**).

IOS-2 (Santa Ana Boulevard/5th Street and Civic Center Drive Couplet). IOS-2 follows the same alignment as Streetcar Alternative 2, but terminates at Raitt Station rather than extending to Harbor Station (**Figures 2-6 through 2-8**). The IOS-2 streetcar alignment is about 2.6 miles in length. IOS-2 includes the same project features and design options as Streetcar Alternative 2 between Raitt Street and SARTC (**Table 2-3**).

2.6 Key Attributes

2.6.1 Western Terminus Elevated Crossing

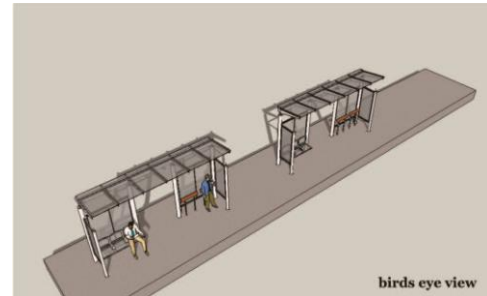
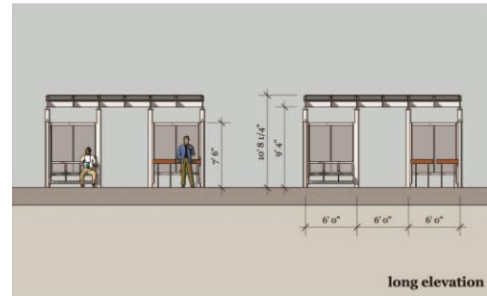
The western terminus for both of the streetcar alternatives is located at the northeast corner of Harbor Boulevard and Westminster Avenue; the transition from the PE ROW to the western terminus site will include an elevated crossing. This crossing is illustrated in **Figure 2-9**.

2.6.2 Streetcar Stations

The stations for each streetcar alternative alignment are located curbside adjacent to the platforms within the public ROW. They will consist of a shelter constructed substantially of transparent materials. In addition to seating, the stations will provide traveler information such as estimates of next train arrival time. The two terminus stations will include parking (approximately 52 spaces at the western terminus station; shared-use of SARTC parking for the eastern terminus station). The terminus stations and one inline station in the Downtown

area will also include ticketing machines for the convenience of passengers who may want an alternative to the on-vehicle ticketing during busy peak periods.

Streetcar Alternative 1 includes 12 stations along its 4.15-mile long alignment. Streetcar Alternative 2 includes 13 stations along its 4.2-mile long alignment. An additional station is included in Streetcar Alternative 2 compared to Streetcar Alternative 1. It is located at Flower Street and 6th Street for the westbound streetcar couplet. This is because of the distance between the directional Flower Street stations in Streetcar Alternative 2, with the eastbound stop at Santa Ana Boulevard and the corresponding westbound stop at Civic Center Drive. Additionally, Flower Street, at 6th Street, is a gateway to the Civic Center Plaza with City, County, State and federal offices, as well as the Orange County Sheriff's Department and jail, and the Santa Ana Police Department.



Views of typical streetcar station structure and platform.

Source: Cordoba Corporation

2.6.3 Streetcar Vehicles



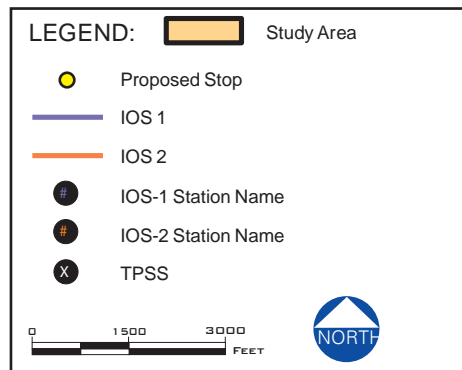
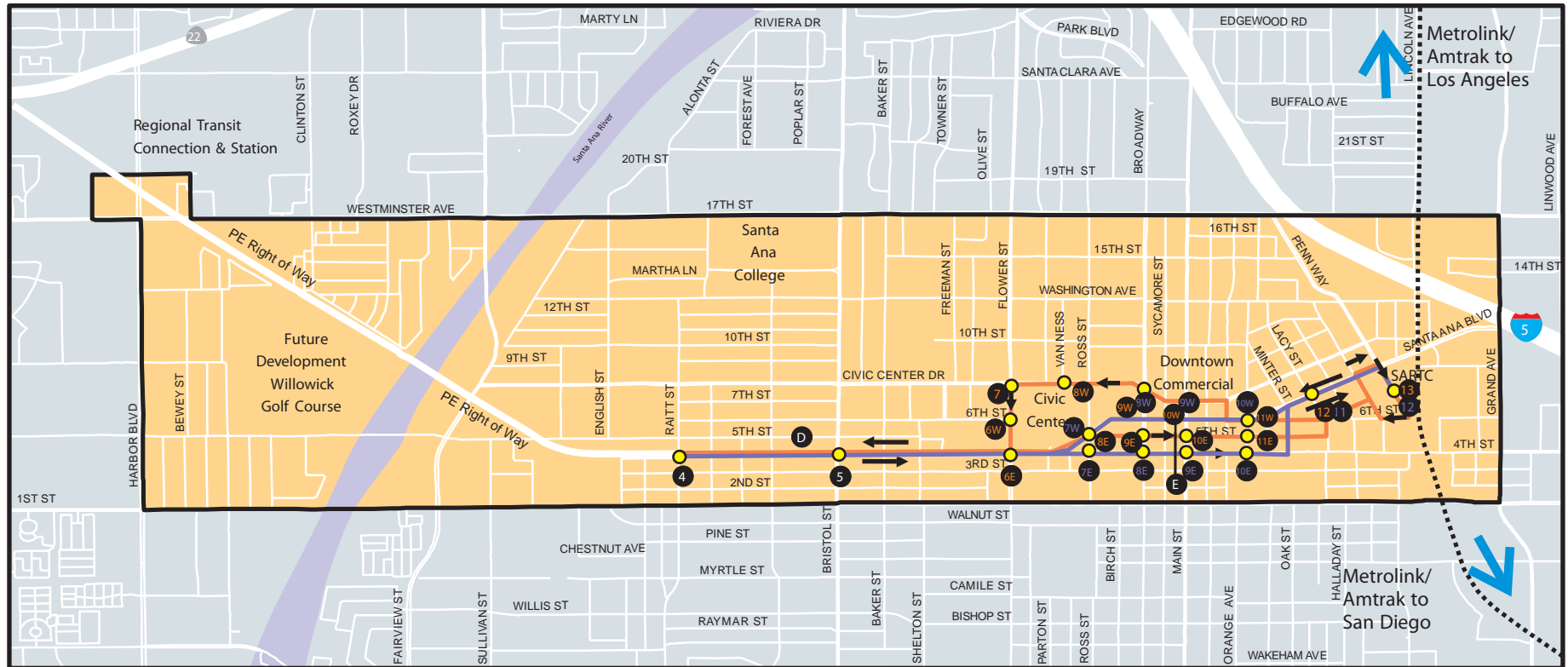
Views of typical streetcar vehicles.

Source: Cordoba Corporation

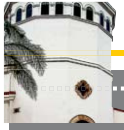
Two types of streetcar vehicles have been identified for use: classic European style streetcar, and the CPUC-compliant vehicle. The former would be similar to the vehicles currently in service in Portland, Oregon and Tucson, Arizona, manufactured by Oregon Ironworks. Neither the Portland vehicle nor the Tucson vehicle meet all CPUC structural requirements, and would therefore require either a waiver from the CPUC or a revision of the CPUC regulations that specifically acknowledge streetcars operating in mixed flow traffic at lower speed. The CPUC-compliant vehicle is derived from a light rail vehicle design. Light rail vehicles are typically CPUC-compliant and do not require CPUC waivers. The Siemens built "S70 short" is a CPUC-compliant vehicle. Both the Oregon Ironworks vehicle and the Siemens vehicle comply with Section 165: "Buy America" provisions of the Surface Transportation Assistance Act of 1982.



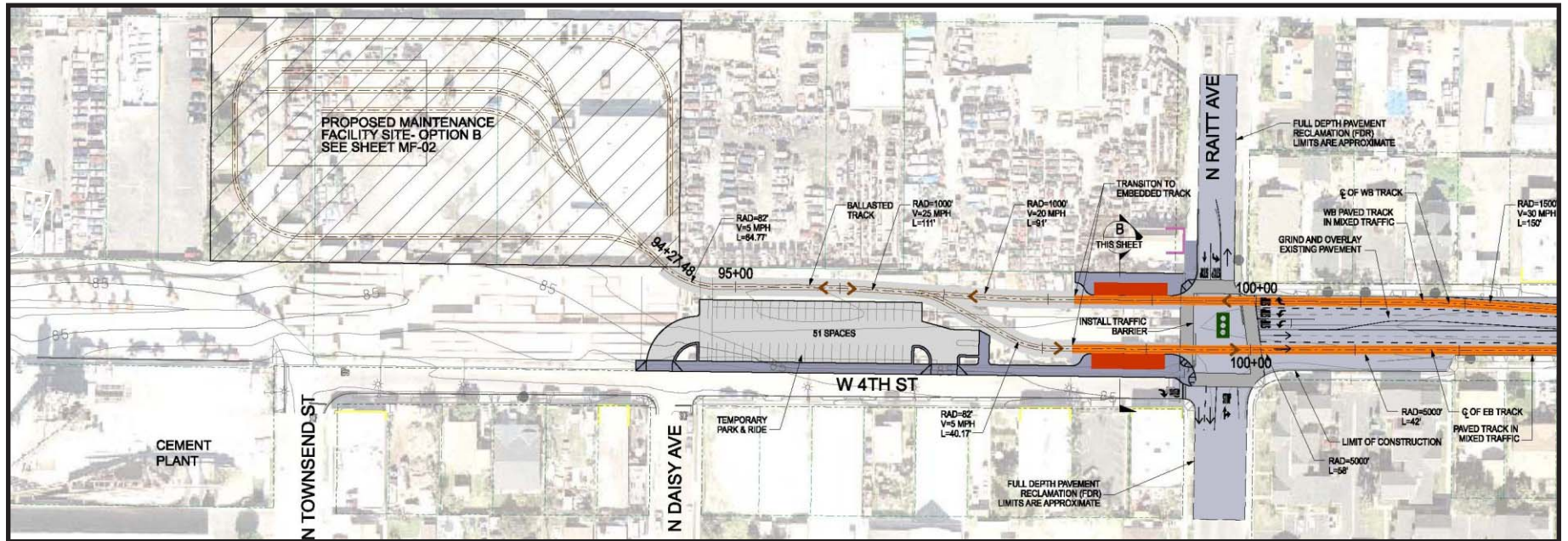
IOS-1 and IOS-2 Alignments



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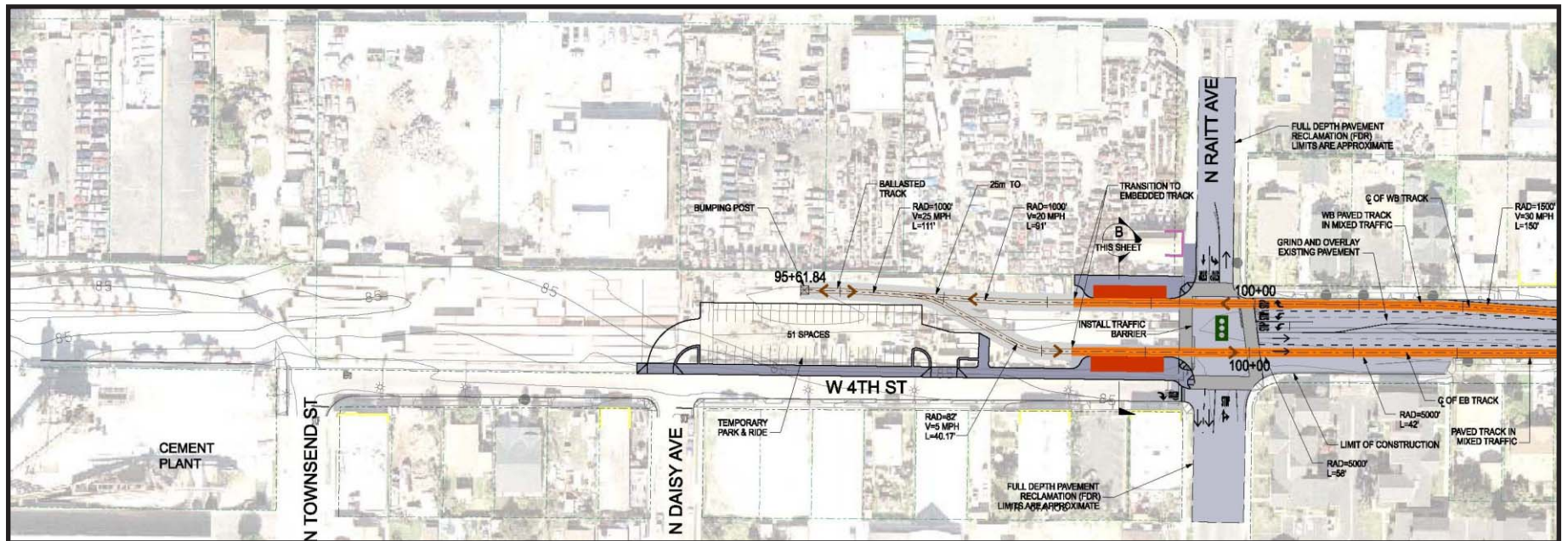
IOS-1 and IOS-2 Raitt Street Terminus Configuration with O & M Facility Site B



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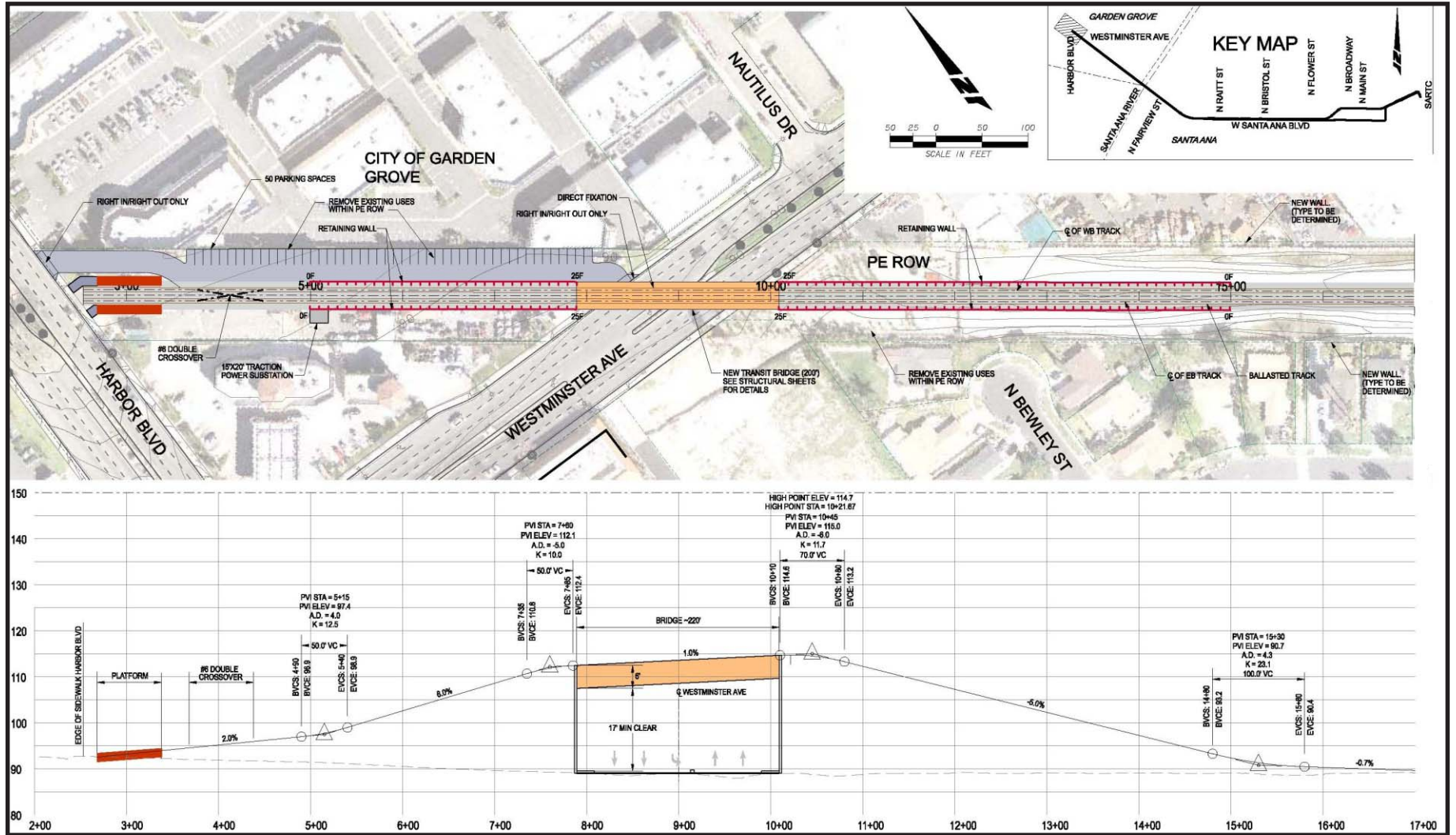
IOS-1 and IOS-2 Raitt Street Terminus Configuration without O & M Facility Site B



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Western Terminus Design



Source: Cordoba Corporation, Draft Alternatives Analysis Report for the Santa Ana-Garden Grove Fixed Guideway Corridor Study, April, 2014.

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TABLE 2-3: KEY PHYSICAL AND OPERATIONAL ATTRIBUTES OF STREETCAR IOS-1 AND IOS-2

Key Attributes	IOS-1	IOS-2	
Termini	Western Terminus: Raitt St. Eastern Terminus: SARTC		
Alignment Description	<u>Routing by Segment:</u> <ul style="list-style-type: none"> • Santa Ana Blvd., from Raitt St. to Ross St.: streetcars operate in the street, at grade, bi-directionally, along with mixed-flow traffic. • 4th St./Santa Ana Blvd. Couplet, from Ross St. to Mortimer St.: streetcars operate in the street, at grade, one-way, along with mixed-flow traffic. • Santa Ana Blvd., from Mortimer St. to SARTC: streetcars operate in the street, at grade, bi-directionally, along with mixed-flow traffic. 	<u>Routing by Segment:</u> <ul style="list-style-type: none"> • Santa Ana Blvd., from Raitt St. to Flower St.: streetcars operate in the street, at grade, bi-directionally, along with mixed-flow traffic. • Santa Ana Blvd./5th St. and Civic Center Dr. Couplet, from Flower St. to Minter St.: streetcars operate in the street, at-grade, one-way, along with mixed-flow traffic. • 6th St./Brown Street, from Minter St. to Poinsettia St.: streetcars operate in the street, at-grade, bi-directionally, along with mixed-flow traffic. • Poinsettia St./Santa Ana Blvd./Santiago St./6th St. (SARTC Loop): streetcars operate in a one-way loop, in the street, at-grade, along with mixed-flow traffic. 	
Length of Alignment	2.2 miles (Raitt St. to SARTC)	2.6 miles (Raitt St. to SARTC)	
Stations	<u>Station Locations:</u>		
	4. Raitt St. and Santa Ana Blvd. 5. Bristol St. and Santa Ana Blvd. 6. Flower St. and Santa Ana Blvd.		
	<i>Couplet Section (Eastbound)</i> 7E. Sasser Park 8E. Broadway and 4 th St. 9E. Main St. and 4 th St. 10E. French St. and 4 th St.	<i>Couplet Section (Westbound)</i> 7W. Ross St. and Santa Ana Blvd. 8W. Broadway and Santa Ana Blvd. 9W. Main St. and Santa Ana Blvd. 10W. French St. and Santa Ana Blvd.	<i>Couplet Section (Eastbound)</i> 6E. Flower St. and Santa Ana Blvd. 7E. ----- 8E. Ross St. and Santa Ana Blvd. 9E. Broadway and 5 th St. 10E. Main St. and 5 th St. 11E. French St. and 5 th St.
	11. Lacy St. and Santa Ana Blvd. 12. SARTC	12. Lacy St. and Santa Ana Blvd. 13. SARTC	<i>Couplet Section (Westbound)</i> 6W. Flower St. and 6 th St. 7W. Flower St. and Civic Center Dr. 8W. Van Ness Ave.* and Civic Center Dr. 9W. Broadway and Civic Center Dr. 10W. Main St. and Civic Center Dr. 11W. French St. and Santa Ana Blvd.
Headways	Peak: 10 minutes (6:00 a.m. to 6:00 p.m.) Off-Peak: 15 minutes (after 6:00 p.m.)		
Hours of Operation (in revenue service)	Monday – Thursday: 6:00 a.m. to 11:00 p.m. (17 hours) Friday and Saturday: 6:00 a.m. to 1:00 a.m. (19 hours) Sunday: 7:00 a.m. to 10:00 p.m. (16 hours)		
Power Source	Electric, Overhead Contact System, Traction Power Substations (TPSS) TPSS Locations: d. North on Santa Ana Boulevard. East of Bristol Street e. North of 5 th Street, east of Main		
Operations and Maintenance Facility Sites	Two Candidate Sites: • Site A: South of SARTC, bordered by 4 th St., 6 th St., Poinsettia St. and Metrolink tracks. • Site B: West of Raitt St., between the PE ROW and 5 th St.		

Source: Cordoba Corporation, Conceptual Design Plan Set, October 2012.

2.6.4 Santa Ana River Crossing

Both streetcar alternatives would utilize the PE ROW and cross over the Santa Ana River. This alignment was once used for the Pacific Electric Railway red car system and the Old Pacific Electric Santa Ana River Bridge still remains. However, it has long been closed for use and not utilized by vehicles or pedestrians since 1950. The historic bridge is inadequate to accommodate the proposed project due to its age, size, (it was constructed as a single-track bridge), disrepair, undetermined structural integrity (both superstructure and foundation) and non-compliance with current building and safety requirements. Four design options were developed for Streetcar Alternatives 1 and 2 at the Santa Ana River Crossing.

These design options were evaluated against identified criteria (cost, feasibility, and potential impacts) to determine which were to be carried forward for evaluation in the EA/DEIR. As detailed in the Section 4(f) Resources Technical Report, Appendix D, and Bridge Design Options Technical Memorandum, Appendix N, four design options were developed for Streetcar Alternatives 1 and 2 at the Santa Ana River Crossing. One was determined feasible for carrying forward for analysis in the EA/DEIR, as illustrated in **Figure 2-10**.

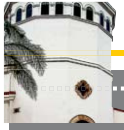
The existing bridge would remain in its current location and condition. A new single-track bridge would be constructed immediately south of the existing bridge for the fixed guideway. Through the use of gates and signaling, the single-track bridge would accommodate bi-directional fixed guideway traffic.

2.7 Design Options

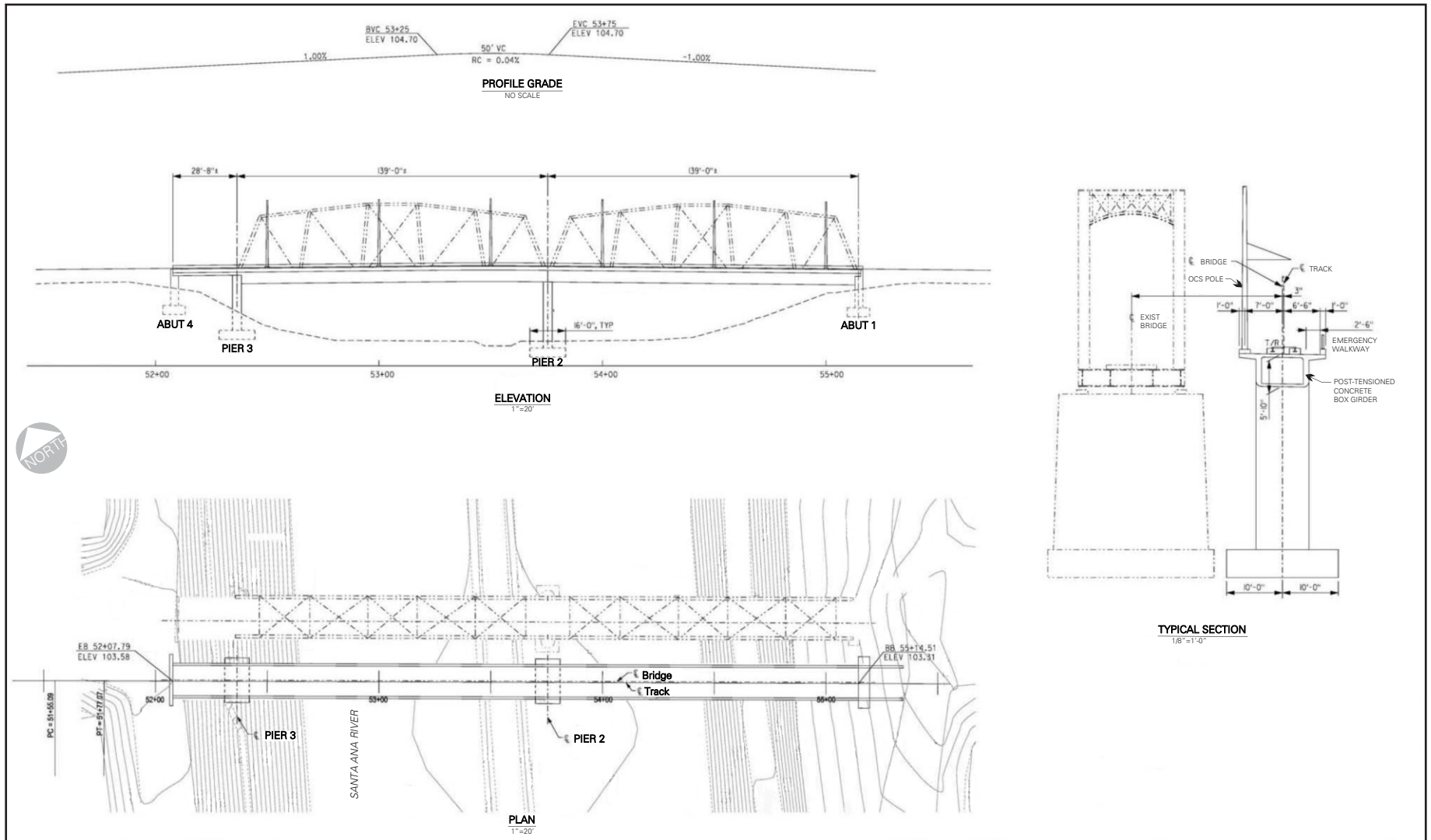
During detailed evaluation, design options were developed to avoid identified constraints or to take advantage of specific opportunities presented along the alignments. In most cases the design options are the same for Streetcar Alternatives 1 and 2. However, where the design option is unique to a specific alternative, it is identified in the discussion. The full results of the analysis of the design options are provided in the Detailed Evaluation of Alternatives Technical Report, March 2012. Based on this technical report, the design options that have been carried into the environmental assessment are described below:

2.7.1 Operations and Maintenance (O & M) Facility Site Options

Both Streetcar Alternatives 1 and 2 would require the construction of an O & M Facility for streetcar operations. An O & M Facility is a stand-alone building which would meet the maintenance, repair, operational and storage needs of the proposed streetcar system. The O & M Facility accommodates daily and routine vehicle inspections, interior/exterior cleaning of the streetcars, preventative (scheduled) maintenance, unscheduled maintenance, and component change-outs. The proposed facility would also provide a venue for parking vehicles that are not in use and for rebuilding components.



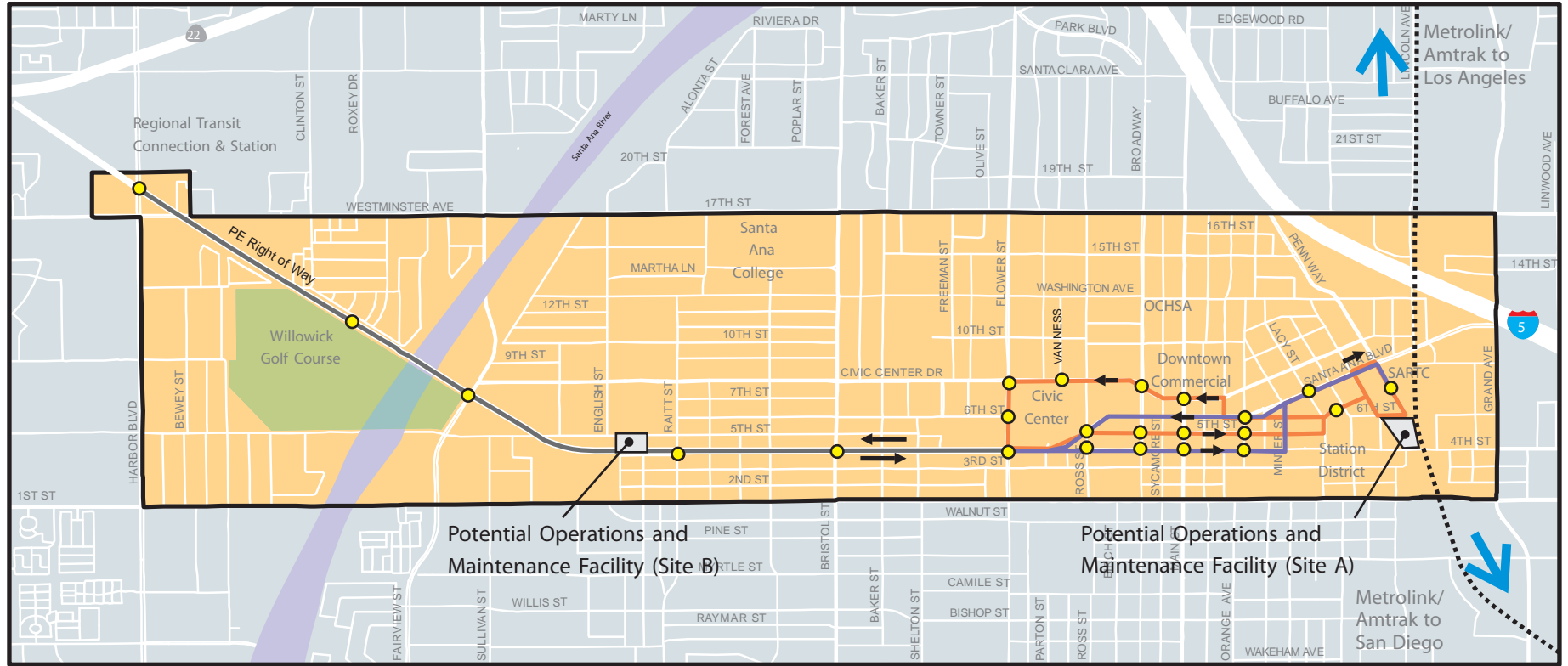
Santa Ana River Crossing



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Candidate Sites of Operations and Maintenance Facilities



LEGEND:

- Study Area
- Streetcar Alternatives 1 and 2
- Streetcar Alternative 1
- Streetcar Alternative 2
- Proposed Stop
- Potential Operations and Maintenance Facility Site

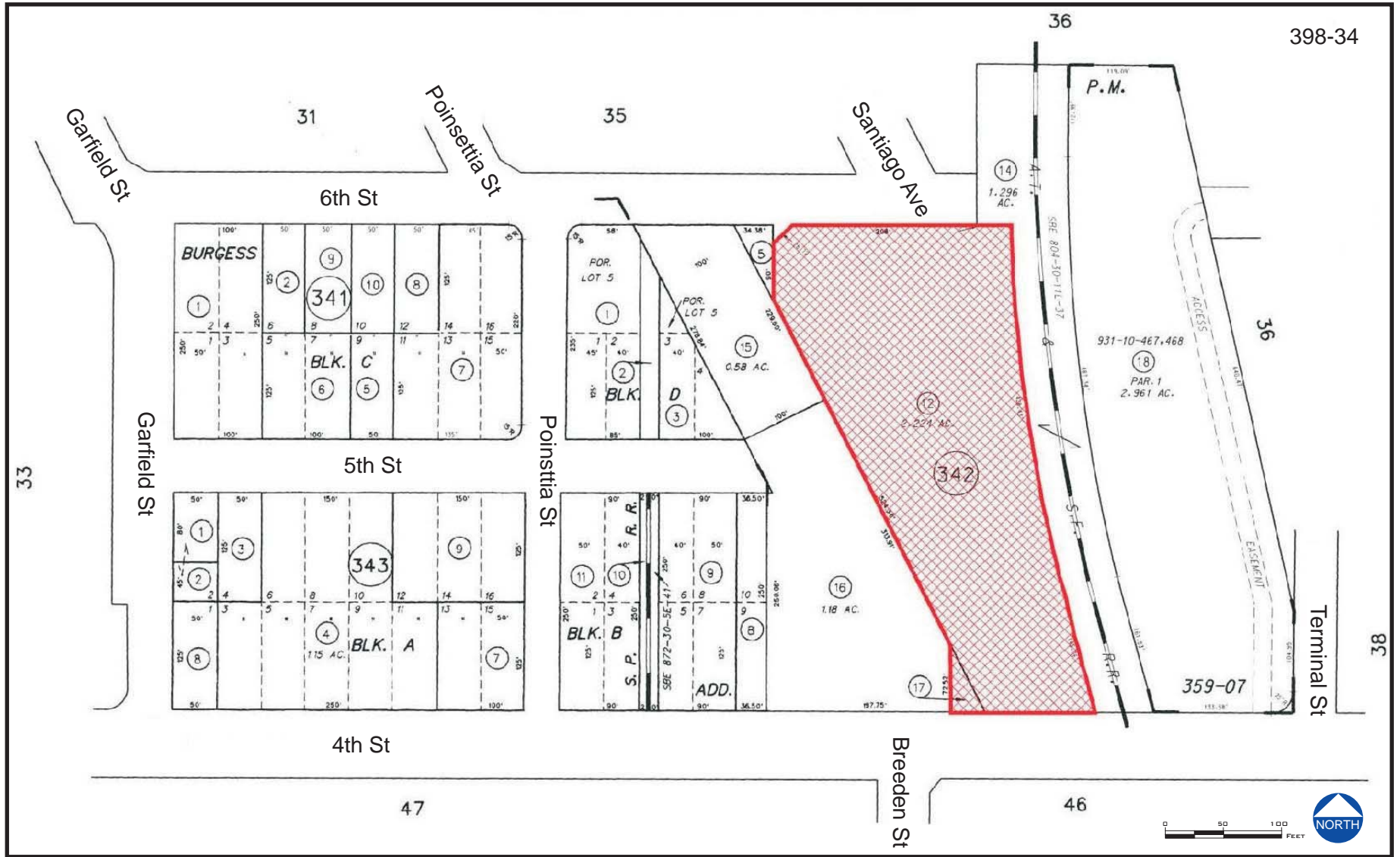
0 1500 3000 FEET

Source: Cordoba Corporation, Draft Conceptual Design Technical Report, April 2014.

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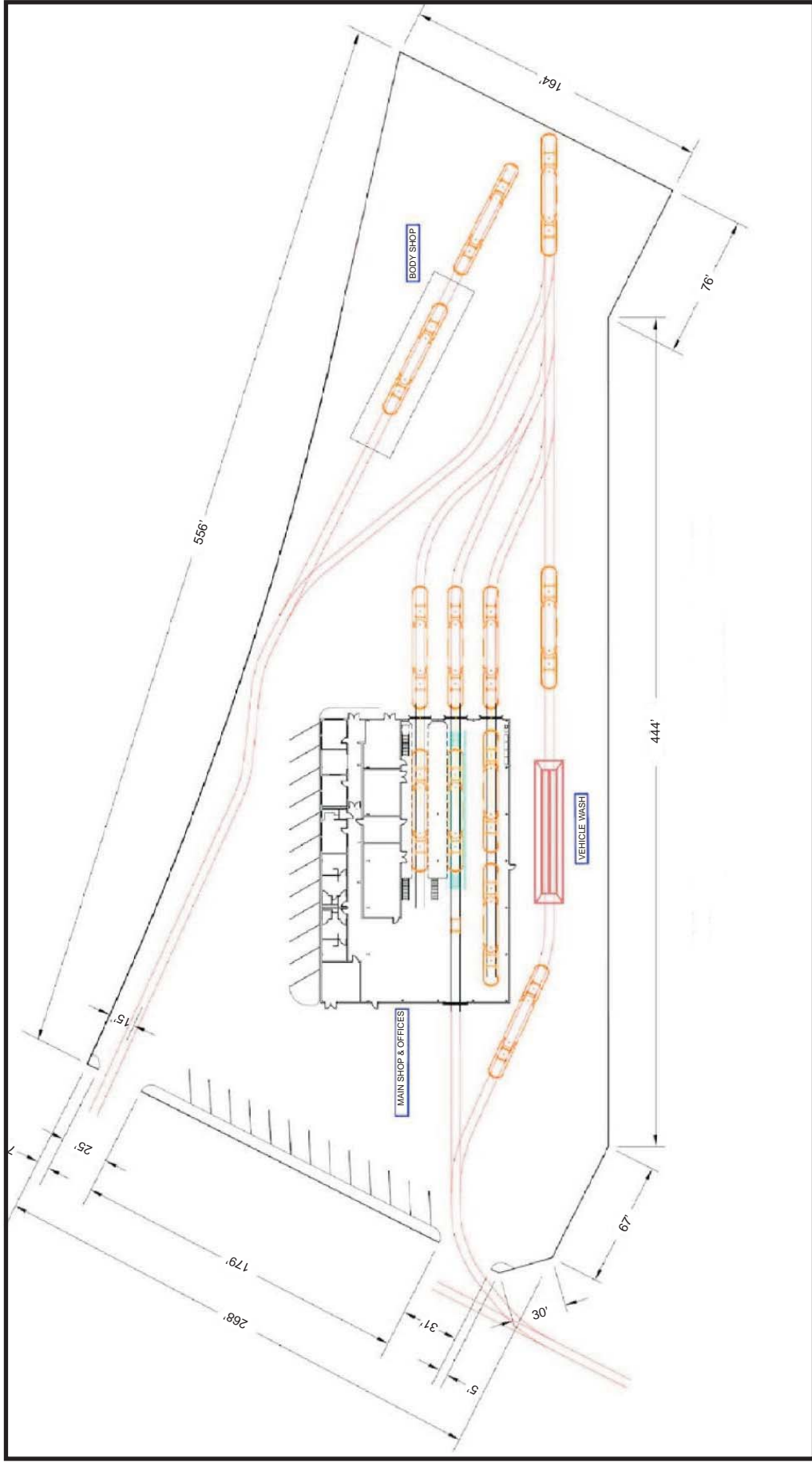
Operations and Maintenance Facility Site A - Location and Configuration



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Operations and Maintenance Facility Site A - Conceptual Layout



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The site for the O & M Facility would need to accommodate a building that houses both maintenance and administrative functions; provides for off-street employee parking; and provides for various functions such as outside storage of system components, vehicle washing, and local requirements for landscaping and screening. Currently, two candidates O & M Facility sites have been identified for either Streetcar Alternative 1 or 2. See **Figure 2-11** for the approximate locations of these sites.

O & M Facility Site A (near SARTC). O & M Facility Site A is an irregularly shaped parcel slightly larger than 2.2 acres, and bordered by 6th Street to the north, 4th Street to the south, the Metrolink tracks to the east, and various industrial and commercial businesses to the west. Currently used as a waste transfer and recycling center, this site contains one primary structure with the remainder of the site used for receiving and sorting recycling materials, and parking. **Figure 2-12** shows the proposed location of Site A and **Figure 2-13** shows a conceptual layout of Site A. This site connects to either Streetcar Alternative 1 or 2 via a nonrevenue extension of track on Santiago Street for the equivalent of approximately two city blocks.

O & M Facility Site B (near Raitt Street). O & M Facility Site B is a rectangular site slightly larger than 2.4 acres. It is located west of Raitt Street and is bordered by 5th Street to the north and the PE ROW to the south. Located in an area zoned for industrial and commercial uses, this site is comprised of three parcels, two of which contain existing businesses and a combination of industrial buildings. The third parcel contains several residences. **Figure 2-14** shows the proposed location of Site B and **Figure 2-15** shows a conceptual layout of Site B. This site connects to the streetcar alignment for Streetcar Alternative 1 or 2 from the PE ROW. Motor vehicle access to the site would be to and from 5th Street.

2.7.2 Fourth Street Parking Scenarios

The Streetcar Alternative 1 alignment would utilize 4th Street between Ross Street and Mortimer Street in the westbound direction. From east of Ross Street to French Street, 4th Street has one travel lane in each direction with head-in diagonal parking along each side of the roadway. The diagonal parking, with vehicles exiting parking spaces by backing into the travel lane, is incompatible with reliable streetcar operations. Three design scenarios were identified to address the diagonal parking on 4th Street as described below and shown on **Figure 2-16**.

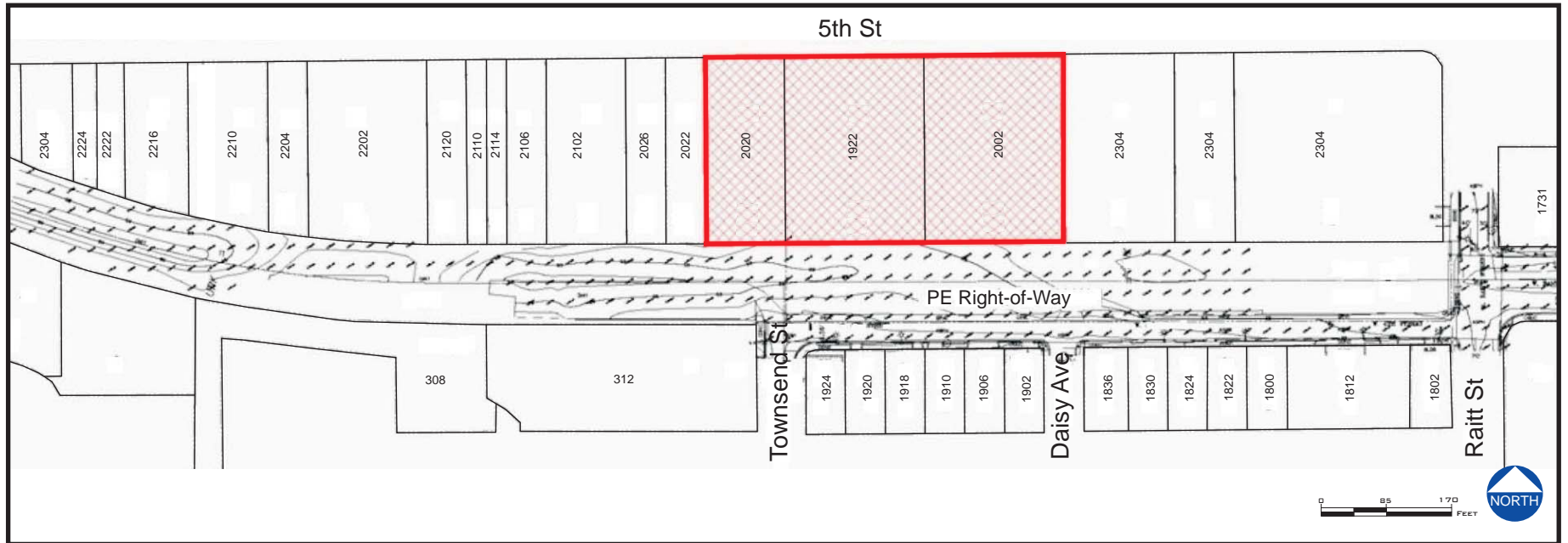
Scenario A: Convert the diagonal parking along the south side of 4th Street, between Ross Street and French Street, to parallel parking and widen the sidewalk along the south side from 12 feet to 20 feet, and replace streetlights and landscaping. A total of 26 on-street parking spaces would be removed under this scenario.

Scenario B: Remove the diagonal parking along the south side of 4th Street, between Ross Street and French Street, and widen the sidewalk along the south side from 12 feet to 28 feet, and replace streetlights and landscaping. A total of 77 on-street parking spaces would be removed under this scenario.

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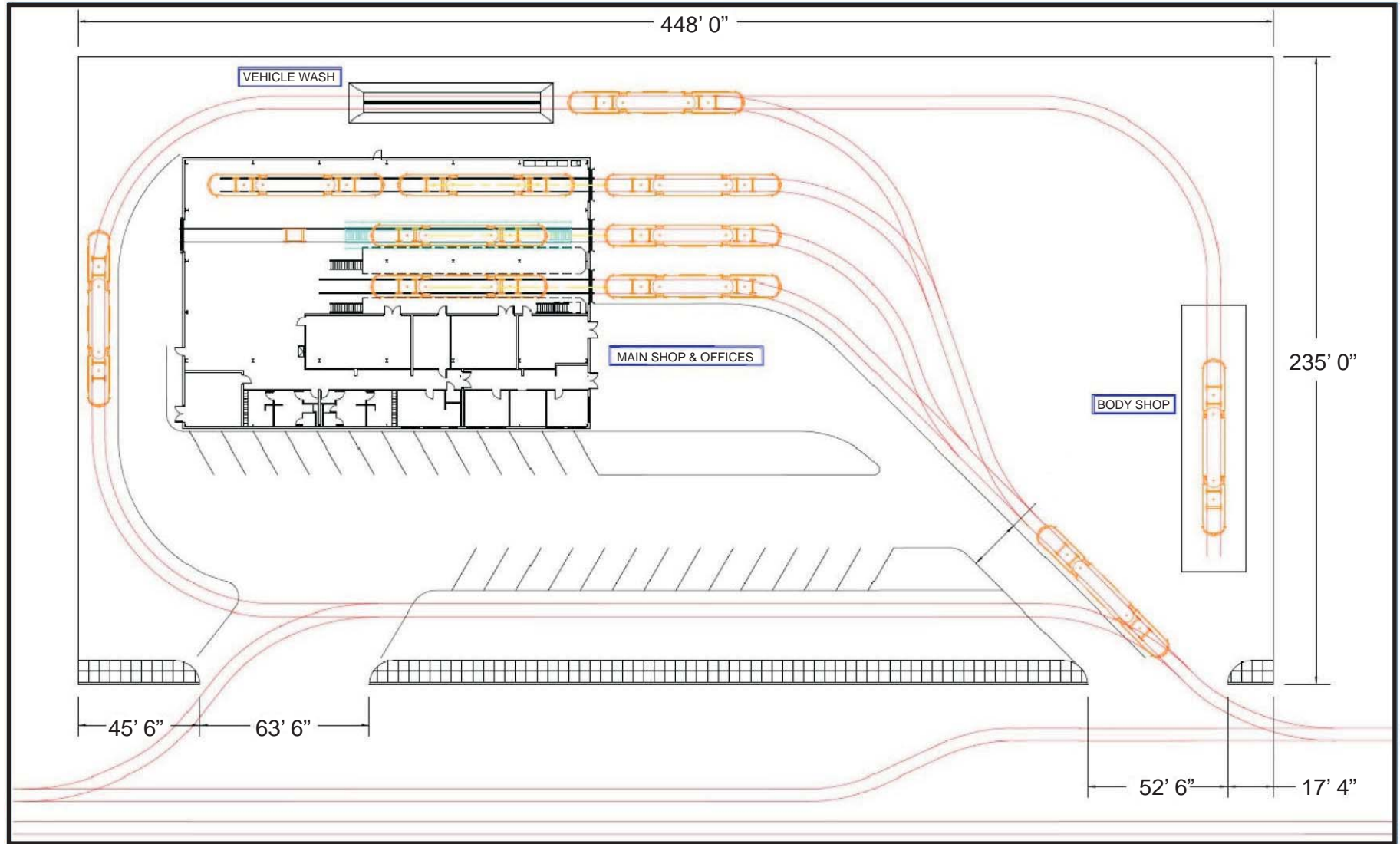
Operations and Maintenance Facility Site B - Location and Configuration



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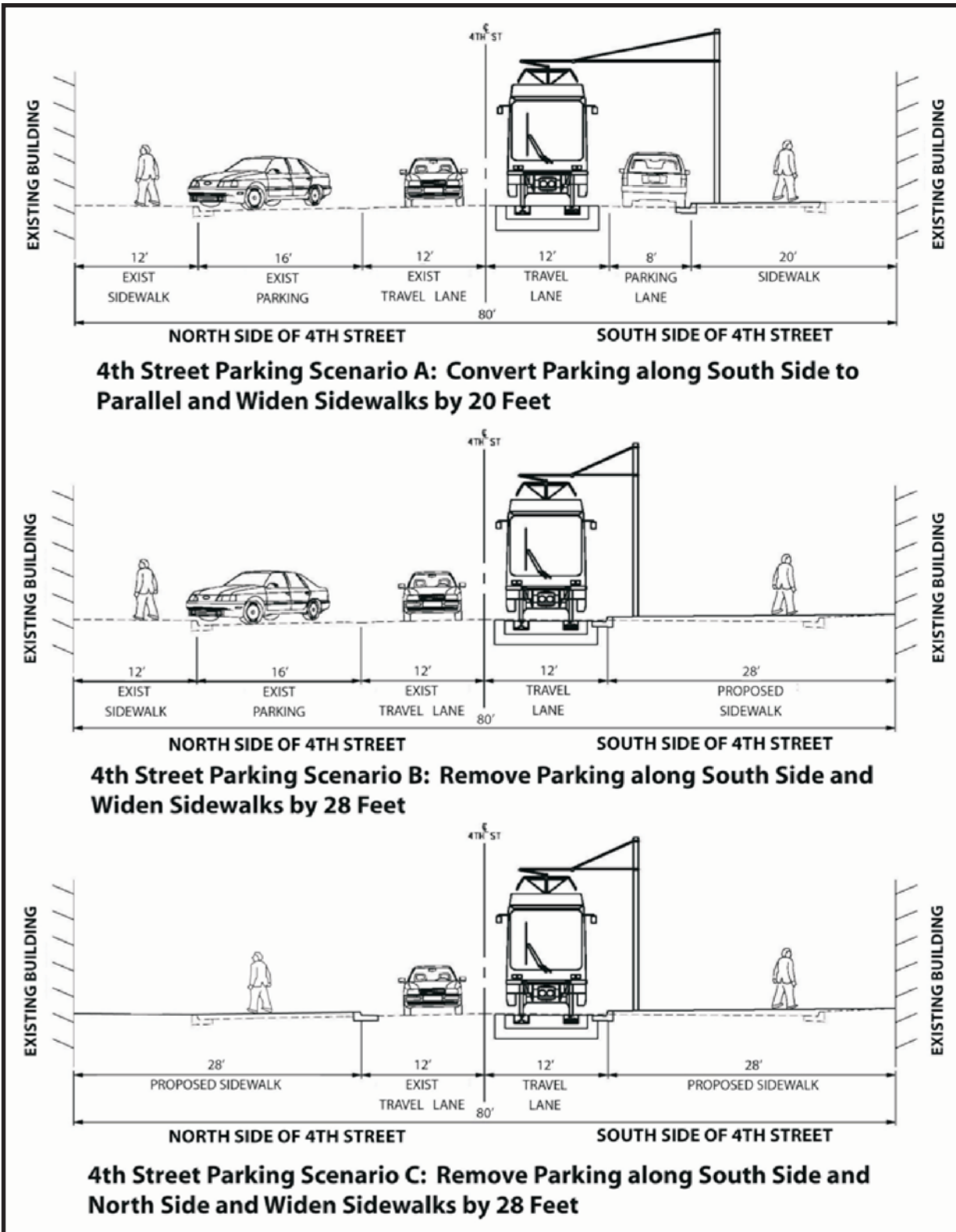
Operations and Maintenance Facility Site B - Concept Layout



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4th Street Parking Scenarios



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Scenario C: Remove the diagonal parking along both sides of 4th Street, between Ross Street and French Street, widen the sidewalks along both sides from 12 feet to 28 feet, and replace streetlights and landscaping on both sides of the street. A total of 132 on-street parking spaces would be removed under this scenario.

2.8 Selection of the Locally Preferred Alternative

Following receipt of public comments on the EA/DEIR, the Santa Ana and Garden Grove City Councils will select a Locally Preferred Alternative (LPA) for the SA-GG Fixed Guideway Project. Their decision will be based on a combination of environmental impacts, community input, cost, ridership and economic development considerations brought to light through the EA/DEIR, AA, and public review process. Subsequent to the City actions, the LPA will be presented to the OCTA Board of Directors. If it is necessary to address comments received during the environmental public review, additional engineering may be performed to refine the conceptual design of the LPA prior to presentation to the City Councils. If a hybrid alternative is selected and it results in changes outside the envelope of the environmental analysis and associated impacts, then an environmental re-evaluation may be needed. Once the LPA has been adopted by the Cities of Santa Ana and Garden Grove, it will be presented to the OCTA Board of Directors as an information item.

2.9 Alternatives Development, Evaluation and Screening

2.9.1 Alternatives Development

In 2009, the cities initiated the Alternatives Analysis and Environmental Review for the SA-GG Fixed Guideway System in coordination with OCTA. The alternatives analysis process, which is described in detail in the SA-GG Fixed Guideway Preliminary Definition of Alternatives Report (June 12, 2011), Initial Alternatives Screening Report (August 5, 2011), and Alternatives Analysis Report (April 2014), consists of four major steps:

1. Preliminary Definition of Alternatives
 - a. Develop an inventory of potential transit technologies appropriate to the study corridor;
 - b. Identify system route options;
 - c. Conduct public outreach;
 - d. Conduct preliminary screening to eliminate technology options that do not satisfy criteria closely related to the Purpose and Need and project goals and objectives and route options that do not satisfy other identified criteria;
 - e. Identify a reduced set of technology and route options and combine these options to create a range of conceptual alternatives that could potentially further satisfy the Purpose and Need and meet the goals and objectives for the project.
2. Initial Screening:
 - 2A. Initial Screening (Route Options)
 - a. Eliminate route options with fatal flaws and those that do not satisfy the Purpose and Need and meet the goals and objectives of the project;

- b. Identify a reduced set of feasible route options;
 - c. Conduct public outreach;
 - d. Define a reduced set of alternatives (routes and technologies combined).
- 2B. Initial Screening (Technology Options)
- a. Eliminate technology options with fatal flaws and those that do not satisfy the Purpose and Need and meet the goals and objectives of the project;
 - b. Identify a reduced set of feasible technology options;
 - c. Conduct public outreach;
 - d. Define a reduced set of alternatives (routes and technologies combined).
3. Detailed Evaluation and Environmental Impact Analysis:
- a. Perform conceptual engineering to provide preliminary information about the physical and operating characteristics of alternatives;
 - b. Prepare environmental analysis to provide preliminary information regarding potential impacts of alternatives;
 - c. Conduct detailed evaluation of the reduced set of alternatives supported by conceptual engineering and environmental analysis;
 - d. Conduct public outreach;
 - e. Select the LPA.

Figure 2-17 illustrates the alternatives development and evaluation process undertaken for the SA-GG Fixed Guideway Project.

2.9.2 Alternatives Evaluation

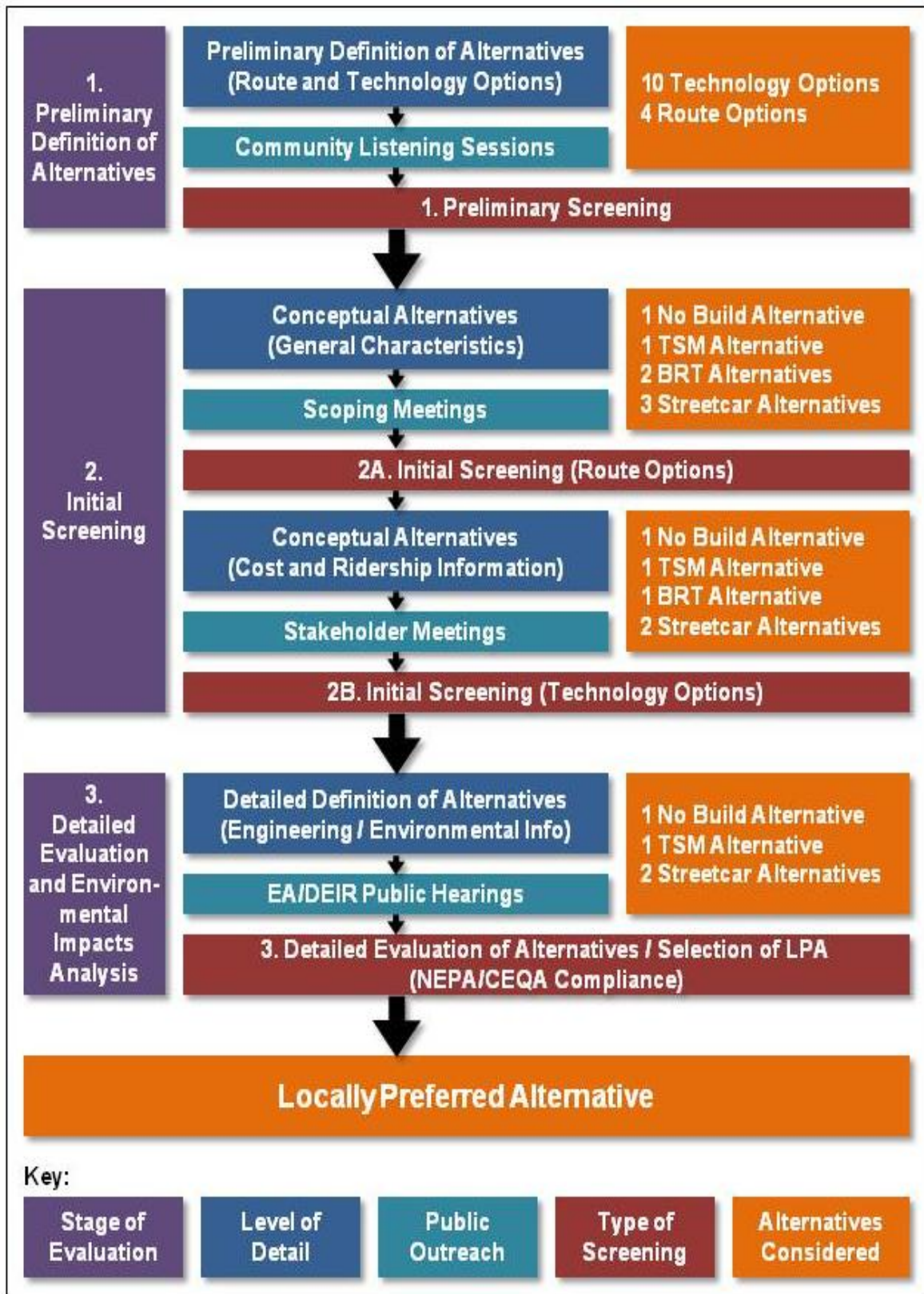
The alternatives evaluation process began with a survey of potential technology and alignment options, the definition of the project’s goals and objectives, development of initial screening criteria based on the Purpose and Need Statement, and engagement with the community through public listening sessions and public scoping.

Potential Technology Options. The Alternatives Analysis process included a comprehensive review of potential technology options. Candidate technologies were defined in The Santa Ana Technology Selection Report (January 6, 2010) which investigated a wide range of potentially suitable technology options for the SA-GG Fixed Guideway Corridor, including:

- Bus Transit
- Bus Rapid Transit
- Streetcar
- Light Rail Transit
- Commuter Rail
- Light Diesel Multiple Unit
- Monorail
- Low Speed Maglev
- Personal Rapid Transit

Potential Alignment Options. The initial alignment options were based on the need to establish an east-west transit corridor in the Study Area, and to improve the Study Area’s regional transit connectivity by providing direct connections to existing and planned transit services

Figure 2-17 Alternatives Development and Analysis Process



(Metrolink and OCTA fixed route and BRT services) at SARTC and at the northeast corner of Harbor Boulevard and Westminster Avenue in the City of Garden Grove. Six alignment options were initially investigated.

Goals and Objectives. The project's goals and objectives are derived from the purpose and need for transportation improvements in the corridor study area, as discussed in Chapter 1. They reflect local, community goals established early in the project. Along with Purpose and Need, these goals and objectives shape the development of transportation alternatives as well as establish the evaluative framework for how transportation alternatives should be assessed and compared in subsequent study phases.

Goal 1: Increase accessibility and livability in the heart of Orange County through transit options that enhance the quality of life within the community.

- Support planned growth in regional rail and bus service
- Enhance connections to regional, interstate, and international bus, rail and air service
- Provide convenient, efficient regional access between SARTC, and employment and activity centers, and residential neighborhoods in central Santa Ana and Garden Grove
- Enhance connectivity between neighborhoods, businesses, and activity centers in central Santa Ana
- Provide employees with improved access to job sites
- Provide additional travel options for students and transit-dependent individuals

Goal 2: Actively foster economic development opportunities, transit supportive land uses, and community goals.

- Stimulate land development opportunities in undeveloped and underdeveloped areas along the corridor
- Provide a transportation system that supports pedestrian activity, and serves higher density development
- Integrate well with surrounding neighborhoods by providing frequent stops with shorter travel distances between stops
- Reinforce transit-oriented development near SARTC and in appropriate locations along the corridor

Goal 3: Promote sustainable and environmentally responsible transportation investments that respond to the needs of the people who live and work within the community.

- Reduce automobile trips by providing high quality transit access and promoting walkability
- Improve air quality; reduce energy consumption, carbon footprint, and greenhouse gas emissions
- Support reduced parking requirements along the corridor where appropriate
- Limit environmental impacts by implementing a system that operates primarily within existing rights-of-way

Goal 4: Deliver travel benefits, reliability, and choice to transportation system users.

- Provide transit service that is user-friendly

- Attract new transit riders
- Provide service that is travel time competitive with personal automobiles
- Use a service-proven technology
- Provide for the safety of the system users and individuals who live in the corridor
- Provide for a reasonable, integrated fare structure

Goal 5: Make cost-effective and financially feasible transportation choices.

- Attract long-term, sustainable public and private investment
- Explore opportunities to reduce or minimize capital costs
- Provide for efficient and cost-effective system operations and maintenance
- Maximize overall system cost-effectiveness
- Maximize ridership
- Minimize cost per rider for long term operations

2.9.3 Public Scoping. In January 2010, the cities engaged the community and resource agencies in Public Listening Sessions to receive input on Purpose and Need, the project development process, project goals, and potential technology and alignment options. A full range of transit modes was presented, including: bus, trolley bus, bus rapid transit (BRT), modern streetcar, light rail transit (LRT), commuter rail, heavy rail transit (subway), monorail, low speed maglev, and personal rapid transit (PRT). Four different alignment alternatives were presented, all of which spanned the full breadth of the four-mile corridor between SARTC and Harbor Boulevard. Through this process, three technologies were identified as the technologies best suited for meeting the Purpose and Need because they were viewed as reliable, affordable, least likely to result in adverse community/environmental impacts, and capable of supporting local economic development goals:

1. Bus (or Trolley Bus)
2. BRT
3. Streetcar

In addition, general requirements for the Santa Ana-Garden Grove Fixed Guideway System were defined to guide the preliminary screening process:

- System must be surface-running
- System must be capable of operating in mixed flow traffic within existing lane widths
- Vehicles compatible with short downtown block face lengths
- System must be compatible with pedestrian activity and pedestrian scale street frontage
- Operating cost per potential passenger must be reasonable
- System must be proven to be reliable in revenue service in the U.S.
- System should operate in the curb lane (except in the PE ROW where it would operate in a dedicated alignment down the center of the available ROW)

In June 2010, the cities conducted formal public scoping through which seven conceptual project alternatives were presented:

- **No Build** – The No Build Alternative includes existing conditions as well as conditions that would be reasonably expected to occur in the foreseeable future without implementation of the proposed project. Conditions in the foreseeable future (through planning horizon year 2035) include other projects that (1) have environmental analysis approved by an implementing agency and (2) have a funding source identified for implementation. The No Build Alternative provides the basis for comparing future conditions resulting from other alternatives proposed.
- **TSM** – The TSM Alternative consists of a number of bus improvements and represents the most that can be done for mobility without construction of major new transportation facilities or physical capacity improvements in the context of the existing transportation infrastructure. As such, the TSM Alternative provides the baseline against which the Build Alternatives (*i.e.*, those that would entail a major investment) are compared. The TSM Alternative emphasizes low cost (*i.e.*, small physical) improvements and operational efficiencies such as focused traffic engineering actions, expanded bus service, and improved access to transit services. Included within the TSM Alternative are modifications and enhancements to selected bus routes in the Study Area; intersection/signal improvements, and bus stop amenity upgrades. While the Build Alternatives utilize the PE ROW the TSM improvements do not since the PE ROW is unpaved and would require construction of a roadway to accommodate bus service.
- **BRT 1 (Civic Center Drive)** – BRT transit line between SARTC and Harbor Boulevard traversing Civic Center Drive and the PE ROW with buses would operating in mixed flow traffic lanes on existing city streets and in new lanes dedicated exclusively to bus use in the PE ROW.
- **BRT 2 (Santa Ana Boulevard/5th Street)** - BRT transit line between SARTC and Harbor Boulevard traversing Santa Ana Boulevard and the PE ROW with a Santa Ana Boulevard and 5th Street couplet through the Downtown area. Buses would operate within mixed flow traffic lanes on existing city streets and in new lanes dedicated exclusively to bus use in the PE ROW.
- **Streetcar A (Santa Ana Boulevard/5th Street)** - Modern streetcar line between SARTC and Harbor Boulevard traversing Brown Street/Santa Ana Boulevard and the PE ROW with a Santa Ana Boulevard and 5th Street couplet through the downtown area. Streetcars would operate in mixed flow traffic on tracks embedded within existing city
- **Streetcar B (Santa Ana Boulevard/4th Street)** - Modern streetcar line between SARTC and Harbor Boulevard traversing Santa Ana Boulevard and the PE ROW with a Santa Ana Boulevard and 4th Street couplet through the downtown area. Streetcars would operate in mixed flow traffic on tracks embedded within existing city streets and on tracks dedicated exclusively for streetcar use within the PE ROW.

- **Streetcar C (4th Street/3rd Street)** - Modern streetcar line between SARTC and Harbor Boulevard traversing Fourth Street/Santa Ana Boulevard and the PE ROW with a 4th Street and 3rd Street couplet through the downtown area. Streetcars would operate in mixed flow traffic on tracks embedded within existing city streets and on tracks dedicated exclusively for streetcar use within the PE ROW.

2.9.4 Initial Screening

Initial screening was performed to identify which of the conceptual alternatives best satisfied the Purpose and Need and project goals and objectives and appeared to be most feasible. This section is meant to summarize the initial screening methodology and screening. The complete initial screening process description can be found in the Alternative Analysis.

The initial screening process consisted of two stages – an early qualitative analysis of the conceptual alternatives resulting in the screening of route options and a subsequent quantitative analysis of the conceptual alternatives resulting in the screening of technology options.

Stage 2A Initial Screening Criteria. Five screening criteria that relate directly to the Purpose and Need and the study goals and objectives were identified for use in stage 2A of the initial screening process:

1. Accessibility and livability
2. Economic development, transit supportive land uses and community goals
3. Environmental responsibility and sustainability
4. Travel benefits, choice and reliability
5. Cost effectiveness and financial feasibility

Measures of effectiveness were developed for each of the screening criteria to differentiate among alternatives (see **Table 2-4**) and to measure and compare their performance. The performance measures also include evaluation criteria adopted by the OCTA Board of Directors for the Go Local program and criteria from FTA’s New Starts/Small Starts program.

TABLE 2-4: INITIAL SCREENING CRITERIA AND MEASURES OF EFFECTIVENESS	
SCREENING CRITERIA	MEASURES OF EFFECTIVENESS
1. Accessibility/Livability	Number of direct connections to (within one block of) designated transfer points/transit nodes
	Number of new transit connections /a/
	Number of residents within 1/2 mile walking distance of proposed alignment
	Number of employees within 1/2 mile walking distance of proposed alignment
	Percentage of designated activity centers or medium-to-high density residential areas within 3 blocks of proposed station
	Degree to which alternative promotes the U.S. Livable Communities Committee’s Principals of Livability
2. Economic Development, Transit Supportive Land Use and	Number of "high opportunity areas" for development/ redevelopment within 1/2 mile of alignment

TABLE 2-4: INITIAL SCREENING CRITERIA AND MEASURES OF EFFECTIVENESS

SCREENING CRITERIA	MEASURES OF EFFECTIVENESS
Community Goals	Qualitative assessment of the transit supportiveness of land uses served by the proposed project /a/
	Potential impacts to physical character of community including physical scale, visual fit
3. Environmental Responsibility and Sustainability	Number of environmental issue areas with potentially significant impacts
	Amount of additional ROW required
4. Travel Benefits, Choice and Reliability	Service-proven technology /a/
	Station/stop spacing
	Transit vehicle capacity
	Qualitative assessment of ease of use and “understandability”
5. Cost Effectiveness and Financial Feasibility	Will be perceived by potential investors/developers as significant long-term public investment
	Capital cost estimate
	Capital cost estimate per mile

/a/ Measure included in the OCTA Board-approved Go Local Program Evaluation Criteria & FTA’s New Starts/Small Starts program.

Stage 2A Initial Screening Results. The streetcar alternatives along Santa Ana Boulevard/4th Street and Brown Street/Santa Ana Boulevard/5th Street performed best overall due in large part to how well they addressed accessibility and livability and supported economic development, transit supportive land use and community goals. Of the BRT options, the alternative along Santa Ana Boulevard/5th Street also performed well in terms of accessibility and livability and economic development, transit supportive land use and community goals.

After careful review and consideration of the stage 2A initial screening results, it was determined that the following alternatives would be eliminated from further consideration because their route options did not best meet the Purpose and Need and project goals and objectives:

Streetcar Alternative - Santa Ana Boulevard/4th Street/3rd Street: Although this route option is the most effective of the alternatives at serving the Downtown area, it is the least effective at serving the Civic Center. As a result, it is also the least effective in serving employment centers. Additionally, the route has a low transit favorability rating in terms of the land uses which front the alignment, with many parking garages, surface parking lots and low-density commercial and industrial areas along the alignment. For these reasons, it was recommended for elimination.

BRT Alternative - Civic Center Drive: This alternative was recommended for elimination from further consideration because its route did not perform as well as the BRT Alternative along Santa Ana Boulevard/5th Street. The Civic Center route does not run within the City’s adopted transit corridors and the route displays slightly fewer residents and employees within

a ¼-mile walking distance and fewer destinations/activity centers within a ¼-mile of proposed stations. The Civic Center route also has less total developed/developable frontage with fewer high opportunity areas for development while surrounding land uses are thought to be significantly less transit supportive.

The remaining conceptual alternatives included:

- Streetcar Alternative – Santa Ana Boulevard/4th Street;
- Streetcar Alternative – Brown Street/Santa Ana Boulevard/Civic Center Drive/5th Street; and
- BRT Alternative – Santa Ana Boulevard/5th Street.

Stage 2B Initial Screening Criteria. The stage 2B initial screening used the five original project goals and objectives to directly compare the remaining three conceptual alternatives. Community supportiveness was also considered. Valuable quantitative data that was not available at the time of the stage 2A initial screening was incorporated into the analysis and used to screen technology options.

Stage 2B Initial Screening Results. This section summarizes the results of second stage of the initial screening of conceptual alternatives. The remaining two streetcar alternatives and BRT Alternative are discussed in terms of the five project goals below:

Goal 1: Increase accessibility and livability in the heart of Orange County through transit options that enhance the quality of life within the community. Both the streetcar alternatives and the BRT Alternative would increase accessibility and livability by providing a new, convenient and efficient transit service/travel option between SARTC and employment and activity centers and residential neighborhoods in central Santa Ana and Garden Grove. Each conceptual alternative would also equally enhance transit connections to regional, interstate, and international bus, rail and air service.

Goal 2: Actively foster economic development opportunities, transit supportive land uses, and community goals. Both the streetcar alternatives and the BRT Alternative would integrate well with the surrounding neighborhood by providing frequent service with short distances between stops and fostering an active pedestrian environment. Each alternative has potential to foster economic development opportunities and supportive land uses by stimulating high-density land development/TOD in underdeveloped and appropriate areas.

Based in part on research that asserts streetcars can stimulate greater economic development and transit supportive land uses in addition to actual and predicted investment in the Study Area in anticipation of streetcar implementation, it can be argued that the streetcar alternatives are more effective than the BRT Alternative in responding to the Livable Communities Initiative.

Goal 4: Deliver travel benefits, reliability, and choice to transportation system users. Both streetcar and BRT service is service-proven and would provide user-friendly and safe service that would attract riders.

However, it should be noted that the BRT Alternative does not perform as well as the streetcar alternatives with regard to transit vehicle capacity. The streetcar alternatives would provide approximately 50 percent greater passenger carrying capacity than the BRT Alternative assuming the same service spans and frequencies for both systems. **Table 2-5** summarizes the assumptions and the resulting number of passengers per hour that could be served by the BRT and streetcar alternatives. The TSM Alternative is also included in Table 2-5 for the purposes of comparison.

TABLE 2-5: TRANSIT VEHICLE CAPACITY			
CHARACTERISTICS	TSM	BRT*	STREETCAR**
Transit Vehicle Crush Load Capacity	70	100	150
Seated	45	60	50
Standing	25	40	100
Headways - Peak Hour	10-min	10-min	10-min
Number of Vehicles per Peak Hour	12	12	12
Number of Passengers per Peak Hour	840	1,200	1,800
Headways - Off-Peak Hour	15-min	15-min	15-min
Number of Vehicles per Off-Peak Hour	8	8	8
Number of Passengers per Off-Peak Hour	560	800	1,200

Source: LTK, Los Angeles Metro, 2011

* For the BRT mode, the Los Angeles Metro Orange Line transit vehicle capacity was assumed.

** For the streetcar mode, a Portland-type transit vehicle was assumed.

Goal 5: Make cost-effective and financially feasible transportation choices. Both the streetcar and BRT services have the potential to attract private investment. However, the streetcar alternatives and the BRT Alternative are differentiated in terms of cost effectiveness. The BRT Alternative did not meet the cost effectiveness objective as measured by projected capital and O&M cost per rider. The BRT Alternative is projected to carry significantly fewer riders than the streetcar alternatives while the capital and O&M costs remain substantial. Projected ridership and cost is discussed in more detail below:

Capital cost effectiveness is measured in **Table 2-6** by dividing the cost differential of the TSM and BRT Alternatives by the ridership differential of the TSM and BRT Alternatives (additional cost per additional rider). From this calculation, it is evident that both streetcar alternatives are more cost effective than the BRT Alternative.

TABLE 2-6: COST EFFECTIVENESS – CAPITAL COSTS					
ALTERNATIVE	PROJECTED CAPITAL COST (2011 MILLIONS)	COST DIFFERENTIAL (MILLIONS)	PROJECTED DAILY RIDERSHIP (2035)	RIDERSHIP DIFFERENCE	ADDITIONAL COST PER ADDITIONAL RIDERS (COMPARED TO THE TSM ALTERNATIVE)
TSM	\$14.5	Baseline	3,100	Baseline	-
BRT	\$116.2	\$101.7	3,800	700	\$145,285
Streetcar 1	\$197.4-\$209.7	\$182.9-\$195.2	6,100	3,000	\$60,967 - \$65,067
Streetcar 2	\$217.0- \$228.1	\$202.5-213.6	4,700	1,600	\$126,562 - \$133,500

Source: Cordoba Corporation, Santa Ana and Garden Grove Fixed Guideway Corridor Study Draft Alternatives Analysis Report, April 2014.

Cost effectiveness is also shown in terms of annual O&M cost per daily rider in **Table 2-7** below. The annual O&M cost per rider is lower for the streetcar alternatives than for the BRT Alternative. However, the TSM Alternative exhibits the highest annual O&M cost per rider at \$4,285.

TABLE 2-7: COST EFFECTIVENESS – O&M COSTS			
ALTERNATIVE	PROJECTED ANNUAL O&M	PROJECTED DAILY RIDERSHIP (2035)	ANNUAL COST PER DAILY RIDER
TSM	\$13,282,258	3,100	\$4,285
BRT	\$5,059,776	3,800	\$1,332
Streetcar 1	\$4,933,284	6,100	\$809
Streetcar 2	\$6,110,656	4,700	\$1,300

Source: Cordoba Corporation, Santa Ana and Garden Grove Fixed Guideway Corridor Study Draft Alternatives Analysis Report, April 2014.

The streetcar alternatives along Santa Ana Boulevard/4th Street and Brown Street/Santa Ana Boulevard/Civic Center/5th Street performed best overall because they satisfied all five project goals used as criteria to compare alternatives. Alternatively, the BRT alternative along Santa Ana Boulevard/5th Street only met four of five project goals and objectives. In addition, project stakeholders and the general public were not as supportive of the BRT mode as they were of the modern streetcar.

After careful review and consideration of the Stage 2B initial screening results, it was determined that the BRT Alternative would be eliminated from further consideration because the technology option did not best meet the Purpose and Need and project goals and objectives, as summarized below:

BRT Alternative Santa Ana Boulevard/5th Street – This BRT Alternative was recommended for elimination because it was projected to carry significantly fewer riders than the streetcar alternatives, which coupled with a substantial capital and annual O&M costs, would make the alternative less cost effective in terms of both capital and O&M costs per rider.

Therefore, the remaining conceptual alternatives include:

- Streetcar Alternative Brown Street/Santa Ana Boulevard/Civic Center/5th Street; and
- Streetcar Alternative Santa Ana Boulevard/4th Street.

2.10 Intended Use

This EA/EIR will be used by the City of Santa Ana, OCTA, and FTA to assess the environmental impacts that would result from construction and operation of the project, and to identify mitigation measures necessary for final certification of the EA/EIR and approval of the project and construction contract. Following public review of the EA/EIR, responses to comments will be prepared and the Santa Ana and Garden Grove City Councils will select an LPA to be carried forward for preliminary engineering and final design. As the lead agency under CEQA, the Santa Ana City Council will certify the Final EIR, adopt appropriate findings,

approve the Mitigation Monitoring and Reporting Program and file a Notice of Completion. The Cities of Santa Ana and Garden Grove will use the EA/EIR to adopt the LPA. FTA will use the EA/EIR to consider the economic, social, and environmental effects of the project prior to issuing a Finding of No Significant Impact (FONSI) and granting federal funding. The following permits are anticipated for which this environmental document will be used.

Issuing Agency	Permit Name
California Public Utilities Commission	Approval of Grade Separations/Crossings and horn-sounding exemption for the crossing at 5th and Fairview Streets
Cities of Santa Ana and Garden Grove	Construction Noise Permit
Cities of Santa Ana and Garden Grove	Traffic Control Permit
Cities of Santa Ana and Garden Grove	Public Right-of-Way Permit
Southern California Regional Rail Authority	Right-of-Entry Permit
Santa Ana Regional Water Quality Control Board	Clean Water Act 401 Water Quality Certification
Santa Ana Regional Water Quality Control Board	Stormwater Municipal Separate Storm Sewer System Permit
Santa Ana Regional Water Quality Control Board	National Pollutant Discharge Elimination System Statewide Permit
U.S. Army Corps of Engineers	Clean Water Act Section 404 Permit

Chapter 3.0 Affected Environment/Environmental Consequences

This chapter of the EA/DEIR analyzes the environmental impacts and consequences associated with the implementation of the proposed project alternatives. In compliance with NEPA, this chapter evaluates the relationship of the proposed project to a series of environmental topics, federal legislation, and executive orders.

The EA/DEIR discussion below briefly describes the affected environment and the potential environmental effects of implementation of the proposed project in the horizon year (2035). Where potential effects are identified, measures are provided to minimize or avoid social, economic, or environmental harm. Where applicable, technical studies and analyses are provided as appendices. These technical studies include the regulatory framework discussions.

Analysis of each environmental issue is organized to include the following subsections:

Affected Environment – A description of baseline conditions that could reasonably be expected without implementation of the proposed project.

Environmental Consequences – An analysis of the beneficial and adverse effects of the proposed project.

Measures to Minimize Harm – Wherever adverse effects relative to baseline conditions are identified in the Environmental Consequences subsection, appropriate and reasonable measures are recommended to avoid or minimize those effects to the extent feasible.

CEQA Determination – In compliance with CEQA Guidelines Section 15064.7, a CEQA Determination subsection is included for all topics that have CEQA thresholds. The CEQA Determination subsections assume the existing conditions described in the Affected Environment section and analyze the effects of the proposed project against the established thresholds, assuming the project is implemented under existing conditions.

3.1 Effects Determined Not Adverse

The following environmental resource areas would not be adversely affected by the proposed project and no public comment was received related to these areas during the public scoping process. Therefore, these topics are summarized below, and not discussed in further detail in this EA/DEIR.

3.1.1 Coastal Zones

The Study Area is approximately nine miles northeast of the Pacific Ocean and is not located within a defined Coastal Zone. Therefore, no adverse effects related to coastal zones would occur.

3.1.2 Wetlands and Navigable Waterways

The Santa Ana River is the only surface water feature within the Study Area. The portion of the Santa Ana River within the Study Area is concrete lined, contains no wetlands or hydrophytic vegetation, and is not a navigable waterway. Therefore, no adverse effects related to navigable waterways or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) would occur. See Preliminary Jurisdictional Delineation Technical Report included as Appendix A.

3.1.3 Ecologically Sensitive Areas

The Study Area is not located within a Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan. Therefore, no adverse effects related to conservation plans would occur.

Due to the urban environment and high level of human activities in the project area, only common bird species are likely to nest in the area. However, there is a potential for nesting migratory birds within trees and shrubs throughout the Study Area. Streetcar Alternatives 1 and 2 would remove approximately 65 street trees that could affect nesting migratory birds. It is not anticipated that small scale tree removal would affect nesting birds. However, in order to comply with the Migratory Bird Treaty Act, vegetation, to the extent feasible, would be cleared outside of the typical avian nesting season (February 15 to August 31). For tree removal during the nesting season, the City of Santa Ana will require a qualified biologist to conduct a preconstruction nesting-bird survey. If active nests are observed, the City of Santa Ana will implement a buffer zone around the nests until nesting has ended. See Biological Technical Report included as Appendix B.

3.1.4 Endangered and/or Threatened Plant and Animal Species

No candidate, sensitive, or special status species identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service, are known to occur, or expected to occur, within the Study Area due to the disturbed and developed existing conditions within the urban environment. The literature review and field survey data suggests that the project footprint lacks suitable habitat to support special-status species or receive State or federal Endangered Species Act protections. Therefore, no adverse effects related to endangered and/or threatened plant and animal species would occur. See Biological Technical Report included as Appendix B.

3.2 Land Use and Zoning

This section provides an analysis of land use and zoning compatibility and consistency with relevant plans and policies. The analysis is based on the affected environment and project features, and evaluates operational impacts associated with the proposed project. The assessment of land use effects focuses on consistency with adopted plans and policies, the potential for land use incompatibility, degradation, or disturbance from land use intensification and alteration of the Study Area. Policies within the relevant adopted plans that are inconsistent with the proposed project are discussed individually. Where there are no specific

policies that are inconsistent with the proposed project, a broader description of how the policies are consistent is presented. The compatibility of land uses focuses on both the existing and planned land uses for uses adjacent or likely to be affected by the proposed project.

3.2.1 Affected Environment

Beginning with the western terminus, the Study Area includes the southeast portion of the City of Garden Grove, continues east through the City of Santa Ana along portions of the PE ROW, and terminates immediately south of the Santa Ana Boulevard/Santiago Street intersection at SARTC.

The proposed alignment and the land uses within the Study Area, as designated in the General Plans for the Cities of Santa Ana and Garden Grove are illustrated in **Figure 3.2-1**. The land use designations within the City of Santa Ana include District Center, Industrial, Low-Density Residential, Low- to Medium-Density Residential, Medium-Density Residential, General Commercial, Government Center, Institutional, Open Space, and Professional and Administrative Office. The land use designations within the City of Garden Grove include Low-Density Residential, Medium-Density Residential, Light Commercial, Heavy Commercial, Industrial, and Parks/Open Space. Because the Study Area is urbanized and largely built out, the land uses designated in the General Plans reflect existing land use development patterns.

Within the City of Garden Grove, the portion of the PE ROW that the proposed alignment would follow is designated Light Commercial. The remaining portion of the PE ROW is located within the City of Santa Ana, as is the majority of the Study Area (97 percent). Within the City of Santa Ana, the PE ROW runs adjacent to the Willowick Public Golf Course and the northwestern fork of the Santa Ana River. Both the Santa Ana River and Willowick Public Golf Course are designated as Open Space. Similarly, the PE ROW west of Harbor Boulevard is designated as open space. However, this portion of PE ROW is fenced off from public access and does not function as a traditional open space area.

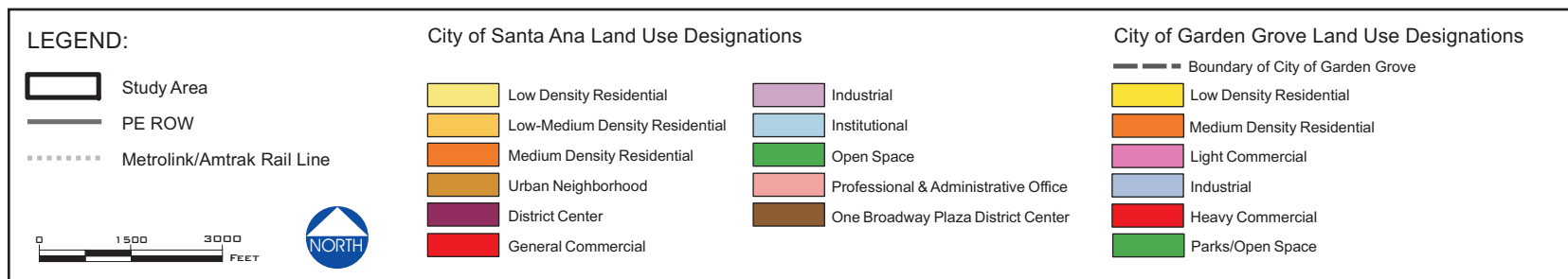
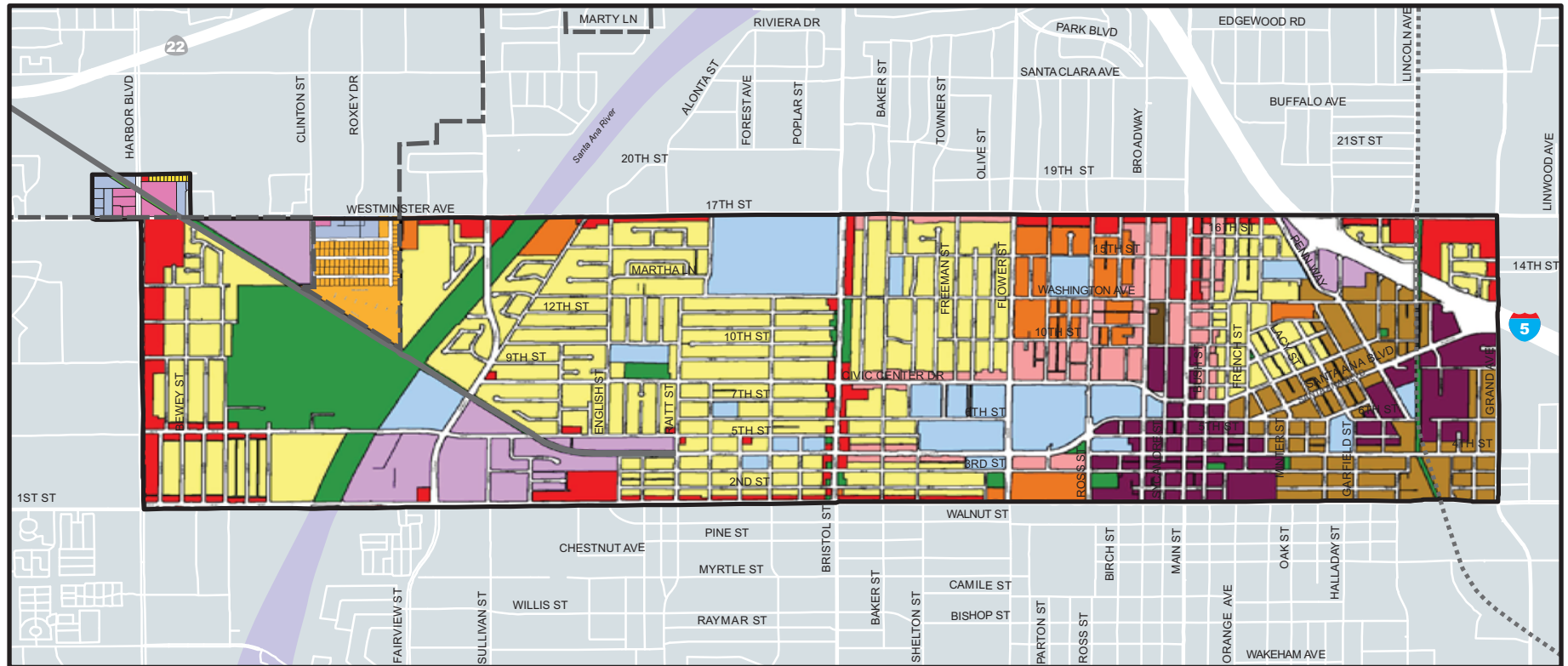
The central portion of the Study Area includes historic Downtown Santa Ana and the Civic Center which houses federal, State and local government agencies, creating high levels of activity, and providing sources of employment and frequently-used services. The Downtown Santa Ana Historic District is listed in the NRHP and is roughly bounded by Civic Center Drive, 1st, Ross, and Spurgeon Streets.

Downtown Santa Ana is a destination for visitors with its historic multi-story buildings housing ground level retail and restaurants with commercial office space above. Land uses west of the Civic Center are largely characterized by low-density residential, general commercial along arterial corridors, with concentrated areas of industrial along the PE ROW, and pockets of institutional land uses. Another historic district listed in the NRHP within this portion of the Study Area is the French Park Historic District, which is roughly bounded by North Bush Street, East Washington Avenue, North Garfield Street, and Civic Center Drive. The Santa Ana Stadium is also located in the central portion of the Study Area in Downtown Santa Ana. The stadium holds 9,000 spectators and is home to the Santa Ana College Dons.

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Study Area Land Use Designations



Source: City of Santa Ana General Plan Land Use Map and the City of Garden Grove GIS maps; updated by Terry A. Hayes Associates Inc. August 2012.

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The eastern portion of the Study Area is characterized as industrial, low- and medium-density residential, and general commercial development along arterial corridors. SARTC, a focal point of transportation in Orange County and an iconic building in Santa Ana, is located at the eastern terminus of the proposed alignment. It combines Amtrak, Metrolink, OCTA, intercity and interstate bus transportation, airport services, and taxi services.

The following discussion summarizes relevant plans, policies, land use and zoning in the Cities of Santa Ana and Garden Grove.

City of Santa Ana General Plan

The Santa Ana General Plan provides long-term guidance and policies for maintaining and improving the quality of life and the resources of the community, both man-made and natural. As a policy document, the Santa Ana General Plan seeks to:

- Support pedestrian access between commercial uses and residential neighborhoods which are in close proximity;
- Encourage development which is compatible with and supportive of surrounding land uses;
- Promote a balance of land uses to address basic community needs;
- Promote land uses which enhance the City's economic and fiscal viability;
- Support a circulation system which is responsive to the needs of pedestrians and vehicular traffic;
- Enhance sidewalks and pedestrian systems to promote their use as a means of travel; and
- Program and prioritize transportation improvements to stimulate growth in major development areas.

City of Santa Ana Specific Plans

The City of Santa Ana has also adopted three specific plan areas to provide greater direction in the development of these areas. All or a portion of each of these specific plan areas are located within the Study Area. These specific plans, which are shown in **Figure 3.2-2** and discussed below, are consistent with the City's General Plan.

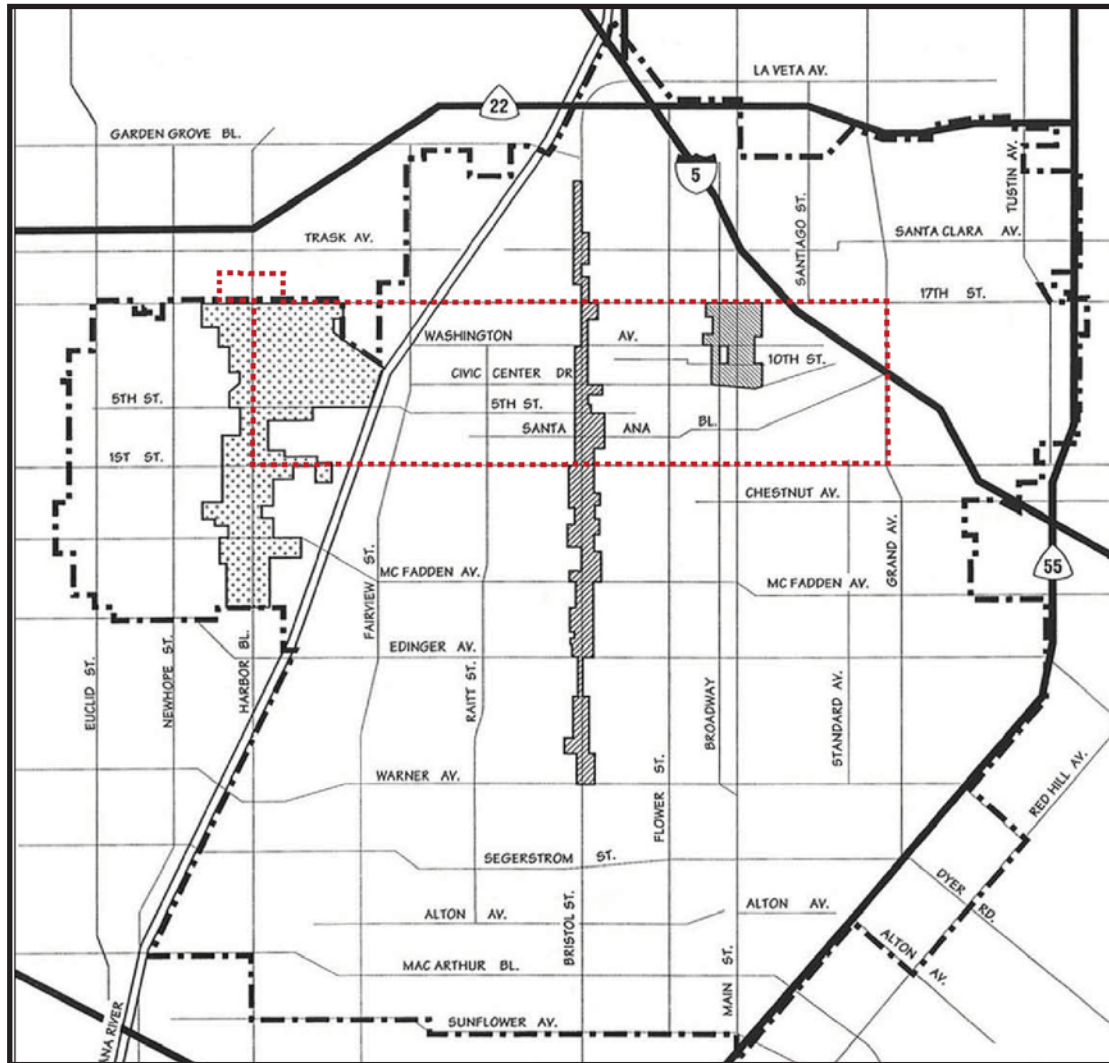
North Harbor Boulevard Specific Plan

The North Harbor Specific Plan promotes quality commercial development and land use compatibility along Harbor Boulevard within a 425-acre planning area. This specific plan aims to provide a mix of high-quality development by integrating existing land uses with future land uses into distinct and coherent nodes of commercial activity. The plan also strives to minimize incompatibility with adjacent residential use while improving pedestrian circulation.

Bristol Street Corridor Specific Plan

The Bristol Street Corridor Specific Plan applies to a 3.9-mile section of Bristol Street in the central portion of the City of Santa Ana. The plan encourages use of alternative modes of transportation, commercial activity at major intersections, and the rehabilitation and expansion of existing businesses along the Bristol Street Corridor.

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LEGEND:

- Study Area
- North Harbor Specific Plan
- Bristol Street Corridor Specific Plan
- Midtown Specific Plan

NORTH

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Midtown Specific Plan

The Midtown Specific Plan area is located north of Downtown Santa Ana and east of the Civic Center near the eastern terminus of the Study Area. This specific plan establishes principles to help guide land use, design, parking and circulation, and to incorporate a fixed guideway rail mass transit system through Midtown.

Santa Ana Transit Zoning Code

The Santa Ana Transit Zoning Code, which was adopted in June 2010, encompasses 450 acres within the Study Area. The vision and intent of the Transit Zoning Code is to provide a transit-supportive, pedestrian-oriented development framework that will facilitate new infill development in existing neighborhoods, reuse of existing buildings, and mixed-use development as a means of improving livability, reducing vehicle trips and lowering greenhouse gas emissions. Specifically, the Transit Zoning Code provides for:

- A mixture of development and open spaces that situates commerce, workplaces, residences, and civic buildings within walking distance of transit and one another;
- Streets that meet the needs of many transit modes including public transit, pedestrians, cyclists and automobiles;
- Development that is maximally transit supportive;
- New and remodeled buildings to work together to define the pedestrian-oriented space of the public streets to support and strengthen the existing character of the neighborhoods in which they are located; and
- The repair and stabilization of the area's existing urban fabric, characterized by an interconnected gridded street pattern and a mixture of architectural styles and uses, in order to support the successful expansion of public transit and compatible development.

The City of Santa Ana's zoning designations within the Study Area include residential, commercial, institutional, civic and open space uses. Most of the uses within the Study Area are zoned low-density residential, which is consistent with land use patterns throughout the City. Commercial uses are generally located along major arterials, such as Bristol and Main Streets. Industrial uses are grouped around the outskirts of the City boundaries while open spaces are scattered throughout Santa Ana. The area surrounding the eastern terminus at SARTC generally has more intensive residential and non-residential land use designations.

City of Garden Grove General Plan

The Garden Grove General Plan provides goals, policies, and implementation strategies concerning future land use within the City of Garden Grove. As a policy document, the Garden Grove General Plan seeks to:

- Encourage active and inviting pedestrian-friendly street environments that include a variety of uses within commercial and mixed use areas;
- Prohibit uses that lead to deterioration of residential neighborhoods, or adversely impact the safety or the residential character of a residential neighborhood;

- Work with OCTA to ensure the proper maintenance of the right-of-way until beneficial interim uses are developed on the right-of-way;
- Encourage “walkable” neighborhoods with pedestrian walkways and bicycle paths in residential and other types of developments to encourage pedestrian rather than vehicular travel;
- Maintain a Citywide circulation system that is balanced with the future land use development anticipated in the General Plan Land Use Element;
- Coordinate with the OCTA to facilitate the potential development of an alternative transportation system along the OCTA right-of-way;
- Work with OCTA to ensure the proper maintenance of the right-of-way until beneficial interim uses are developed on the right-of-way; and
- Encourage the development of projects which promote the City's image as a regional activity center.

City of Garden Grove Land Use Code

The City of Garden Grove Land Use Code is the primary tool for implementing the goals, objectives and policies of the Garden Grove General Plan. The City’s Land Use Code seeks to:

- Retain and enhance established residential neighborhoods, commercial and industrial districts, recreational facilities, other amenities and region-serving uses;
- Allow for the intensification of commercial and industrial uses;
- Accommodate expansion of development into vacant and low-use lands within environmental and infrastructure constraints;
- Maintain and enhance significant environmental resources;
- Provide a diversity of areas characterized by differing land use activities, scale and intensity; and
- Establish an environment that provides the City's residences and businesses with a high quality of life that is both aesthetic and secure.

3.2.2 Environmental Consequences

3.2.2.1 No Build Alternative

The No Build Alternative includes existing conditions within the Study Area and adds future planned and funded transit and roadway improvement projects. Each of these future projects will be environmentally cleared through separate project-specific environmental documentation. The streetcar would not operate under this alternative and there would not be related land use and zoning effects. Therefore, the No Build Alternative would not result in adverse effects related to land use and zoning.

3.2.2.2 TSM Alternative

The TSM Alternative emphasizes low-cost improvements and operational efficiencies, such as focused traffic engineering actions, expanded bus service, and improved access to transit services. It may include some minor physical enhancements, such as improvements to transit stop amenities (e.g., bus benches). These minor improvements would have no or negligible

impacts to land use and zoning. Therefore, the TSM Alternative would not result in adverse effects related to land use and zoning.

3.2.2.3 Streetcar Alternatives 1 and 2

Consistency with Adopted Plans and Policies

City of Santa Ana Plans and Codes

North Harbor Boulevard Specific Plan. Streetcar Alternatives 1 and 2 would improve pedestrian circulation around Harbor Boulevard with sidewalk and pedestrian improvements near the proposed station platforms. This improvement in pedestrian circulation coincides with the North Harbor Specific Plan's goal to increase pedestrian circulation. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to consistency with the North Harbor Boulevard Specific Plan.

Bristol Street Corridor Specific Plan. Both Streetcar Alternatives 1 and 2 would add a streetcar station at Bristol Street and Santa Ana Boulevard within the Bristol Street Corridor Specific Plan area. The streetcar station would encourage higher density residential, job centers, and recreational facilities to develop in the area, which coincides with the Bristol Street Corridor Specific Plan's goal of increased commercial and residential development. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to consistency with the Bristol Street Corridor Specific Plan.

Midtown Specific Plan. Both Streetcar Alternatives 1 and 2 would be consistent with the Midtown Specific Plan's goal of increasing pedestrian activity within the Study Area. The introduction of transit would allow riders to walk to the streetcar stations. Therefore, Streetcar Alternatives 1 and 2 would encourage pedestrian activity within the Study Area. Streetcar Alternatives 1 and 2 would not result in adverse effects related to consistency with the Midtown Specific Plan.

City of Santa Ana Transit Zoning Code. The City of Santa Ana's Transit Zoning Code promotes walkability and minimizes the need for an automobile. Along the western portion of the alignment, Streetcar Alternatives 1 and 2 would provide access to transit and connectivity for neighborhoods which are currently unserved or underserved by transit. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to City's Transit Zoning Code.

City of Garden Grove Plans and Codes

City of Garden Grove General Plan. Streetcar Alternatives 1 and 2 would be consistent with the City of Garden Grove General Plan by providing increased transit opportunities for passengers and residents through establishment of a streetcar system. Within the City of Garden Grove, the proposed alignment would be located within the PE ROW, which is designated for Light Commercial uses. The proposed fixed guideway system is consistent with the City's General Plan Policy to facilitate the potential development of an alternative transportation system along the PE ROW. Therefore, Streetcar Alternatives 1 and 2 would

not result in adverse effects related to consistency with the City of Garden Grove General Plan.

City of Garden Grove Land Use Code. Streetcar Alternatives 1 and 2 would not conflict with the City of Garden Grove Land Use Code. The proposed fixed guideway system would be an environmentally-friendly transportation solution that matches the character of the community and meets the travel needs of the people that live, work, shop and go to school in the area. Streetcar Alternatives 1 and 2 would encourage economic development, create jobs and provide greater mobility for people who depend on public transit. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to consistency with the City of Garden Grove Land Use Code.

Land Use and Zoning Compatibility

Streetcar Alternatives 1 and 2 alignment travels through industrial, medium-density residential, district center, institutional, open space, professional and administrative office, low-density residential, which are consistent with surrounding land uses and zoning. Streetcar Alternatives 1 and 2 would not convert existing land uses or create new land uses that conflict with land uses within the Study Area. While the PE ROW west of Harbor Boulevard is designated as open space in the City of Santa Ana General Plan, this portion of PE ROW is fenced off from public access and does not function as a traditional open space area. This is similar to much of the Pacific Electric corridor within Orange County, which has been preserved for future transit use while allowing temporary interim uses. Therefore, the land uses adjacent to Streetcar Alternatives 1 and 2 would not result in adverse effects related to compatibility with the surrounding land uses and adjacent zoning.

Land uses surrounding the proposed stations and the alignment are densely developed, with commercial and office buildings in the Santa Ana Downtown Civic Center area and residential neighborhoods along Santa Ana Boulevard. Industrial/residential mixed use, heavy commercial and mixed use also predominate the area. Professional offices are located along major arterials at the western terminus of the alignment, and along 4th Street and Santa Ana Boulevard in Downtown Santa Ana. Institutional uses, the courthouse, museums, schools, federal buildings, and other civic structures, are concentrated in Downtown Santa Ana. Stations would be located near public use areas and activity centers to provide increased access to these areas and ease of accessibility to transit, and the introduction of a streetcar would be compatible with the existing land uses along the proposed project alignment. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to compatibility with surrounding land use.

O & M Facility Site A is currently used as a waste transfer and recycling center and is designated for industrial uses. Likewise, O & M Facility Site B is designated for industrial uses, even though there are several residences located on the site. The residences are in an industrial-zoned area and would be acquired as part of the project, and acquisition of these residences for use as transit infrastructure would not conflict with the existing land use designations and zoning. Properties located to the east and west of O & M Facility Site B are also designated for industrial uses. Residential land uses are located to the north of O & M

Facility Site B, beyond the industrial frontage along 5th Street. The O & M Facility Site B would be consistent with the industrial land uses which surround the PE ROW and 5th Street. The proposed use of the site would be more compatible with these residential land uses than the existing waste transfer recycling facility because it would operate with lower intensity industrial usage (i.e., lower heavy-duty truck activity, lower equipment noise, and less visual disruption from waste and stockpiling of materials). In addition, the O & M Facility would incorporate design treatments (e.g., decorative landscaping) to make the site more compatible with the surrounding community than the existing waste transfer and recycling facility. Therefore, O & M Facility Sites A and B would not result in adverse effects related to compatibility with surrounding land use.

Selection of either alternative would encourage new development around the stations, and allow access to Downtown Santa Ana and other high-intensity areas of employment, commercial development, and recreational opportunities. New transit-oriented development would be facilitated near station areas with underutilized or vacant land uses. In addition, commercial and residential developments planned and underway along the Streetcar Alternatives 1 and 2 alignments would bring together pedestrian and business activities through improved access to shops and retail functions. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to compatibility with surrounding land uses and zoning.

3.2.2.4 IOS-1 and IOS-2

IOS-1 and IOS-2 would not comply with the City of Santa Ana's General Plan policies as well as Streetcar Alternatives 1 and 2. The termination of IOS-1 and IOS-2 at Raitt Station would be in an industrially-zoned area. Without existing transit connections, this land use at the terminus of the shortened alignment would not support the Santa Ana General Plan goals of providing circulation and encouraging development that supports surrounding land use as well as Streetcar Alternatives 1 and 2. Although IOS-1 and IOS-2 would not connect to the new transit station in the City of Garden Grove and would not generate as much transit-oriented development along the alignment as Streetcar Alternatives 1 and 2, they would not conflict with adopted plans and policies. Therefore, IOS-1 and IOS-2 would not result in adverse effects related to the Santa Ana General Plan.

IOS-1 and IOS-2 alignments would not be within the limits of the City of Garden Grove; and applicable land use and zoning plans would not be affected. Therefore, IOS-1 and IOS-2 would not result in adverse effects related to City of Garden Grove General Plan and Land Use Code.

IOS-1 and IOS-2 alignments pass the same land uses as Streetcar Alternatives 1 and 2. Similar to Streetcar Alternatives 1 and 2, IOS-1 and IOS-2 would be compatible with the surrounding land uses.

3.2.3 Measures to Minimize Harm

Operational effects related to land use and zoning would not be adverse. No measures to minimize harm are necessary.

3.2.4 CEQA Determination

3.2.4.1 Significance Criteria and Significance Criteria Application

In accordance with Appendix G of the State CEQA Guidelines, the proposed project would have a significant impact related to land use and zoning or agricultural and forestry resources if it would:

- Physically divide an established community;
- 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;
- Conflict with an applicable habitat conservation plan or natural community conservation plan;
- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural use;
- Conflict with existing zoning for agricultural use, or a Williamson Act contract;
- Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g));
- Result in the loss of forest land or conversion of forest land to non-forest use; and/or
- 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 Build Alternative

As discussed in Section 3.2.2.1 above, the streetcar would not operate under the No Build Alternative. This alternative would not change existing land uses or zoning in the Study Area. In addition, there are no farmlands or forest lands within the Study Area. Therefore, the No Build Alternative would result in no impacts related to land use plans, zoning policies, agricultural and forestry resources, or conservation plans.

TSM Alternative

As discussed in Section 3.2.2.2 above, the TSM Alternative would not involve improvements that would significantly impact plans, policies, and regulations in the Study Area. Therefore, the TSM Alternative would result in less-than-significant impacts related to land use plans and zoning policies. In addition, there are no farmlands or forest lands within the Study Area. Therefore, the TSM Alternative would result in no impacts related to agricultural and forestry resources, or conservation plans.

Streetcar Alternatives 1 and 2

Divide an Established Community. Streetcar Alternatives 1 and 2 would operate in-street within the eastern portion of the proposed alignment and in the existing PE ROW between Harbor Boulevard and Raitt Street. These transportation corridors within the Cities of Santa Ana and Garden Grove act as boundaries between neighborhoods. The in-street alignment

would not create a new physical barrier that would divide any portion of the Cities of Santa Ana or Garden Grove. Similarly, the PE ROW was constructed in 1905. The operation of a streetcar along this segment would not create a new physical barrier that divides either city. Therefore, Streetcar Alternatives 1 and 2 would result in no impacts related to dividing an established community.

Conflict with Plans, Policies, and Regulations. On a regional scale, Streetcar Alternatives 1 and 2 would be consistent with the growth management policies of the Southern California Association of Governments (SCAG) 2001 Regional Comprehensive Plan and Guide to improving the standard of living, improve the regional quality of life, and maintain social, political, and cultural equity. They would also be consistent with the air quality and open space policies of the SCAG 2012-2035 RTP/SCS. Streetcar Alternatives 1 and 2 are not likely to significantly change land use and development patterns at a regional scale. The creation of an urban streetcar system rarely creates new growth, but may redistribute growth that would have taken place elsewhere. In addition, transit investments generally require the leveraging effect of supportive public policies along with the pressure of an expanding regional economy to bring about significant changes in land use and urban form at the regional level. Streetcar Alternatives 1 and 2 would be consistent with SCAG regional land use policies of improving mobility for residents and promoting sustainability for future generations. The alternatives, when considered as part of the Orange County transit system, would play an important role in expanding regional transportation choices and in improving regional quality of life, image, and overall mobility. The extent to which the Streetcar Alternatives 1 and 2 attract new growth or results in a redistribution of projected regional growth would depend on favorable market conditions and supportive public policies. Therefore, Streetcar Alternatives 1 and 2 would result in no significant impacts related to regional land use.

As discussed in Section 3.2.2.3 above, the Cities of Santa Ana and Garden Grove have developed a number of plans, policies, and land use and zoning regulations that apply to Streetcar Alternatives 1 and 2. These alternatives would develop an environmentally-friendly transportation alternative that matches the character of the community and meets the travel needs of the people that live, work, shop and go to school in the area. The alternatives would encourage economic development, create jobs and provide greater mobility for people who depend on public transit. Streetcar Alternatives 1 and 2 would improve pedestrian circulation and provide access to transit and connectivity for neighborhoods which are currently unserved or underserved by transit. The above discussion demonstrates consistency with adopted plans and policies. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to plans, policies, and regulations.

As discussed in Section 3.2.2.3 above, Streetcar Alternatives 1 and 2 travel through industrial, medium-density residential, district center, institutional, open space, professional and administrative office, and low-density residential land uses. The alternatives would not convert existing land uses or create new land uses that conflict with land uses within the Study Area, including the PE ROW.

Land uses surrounding the proposed stations and the alignment are densely developed, with commercial and office buildings, residential neighborhoods, commercial buildings, professional offices, the courthouse, museums, schools, federal buildings, and other civic structures. The introduction of a streetcar would be compatible with the existing land uses along the alignment. The Santa Ana Transit Zoning Code, which was adopted in June 2010, encompasses 450 acres within the Study Area or roughly 18 percent. The vision and intent of the Transit Zoning Code is to provide a transit-supportive, pedestrian-oriented development framework that will facilitate new infill development in existing neighborhoods, reuse of existing buildings, and mixed-use development as a means of improving livability, reducing vehicle trips and lowering greenhouse gas emissions. Selection of either Streetcar Alternative 1 or 2 would encourage new development around the stations and allow access to Downtown and other high-intensity areas of employment, commercial development, and recreational opportunities. In addition, commercial and residential developments planned and underway along the Streetcar Alternatives 1 and 2 alignments would bring together pedestrian and business activities through improved access to shops and retail functions.

O & M Facility Site A is currently used as a waste transfer and recycling center and is designated for industrial uses. Likewise, O & M Facility Site B is designated for industrial uses, even though there are six multi-family residences located on O & M Facility Site B. The residences are in an industrial-zoned area and would be acquired as part of the project. The acquisition of these residences for use as transit infrastructure would not conflict with the existing land use designations and zoning. Properties located to the east and west of O & M Facility Site B are also designated for industrial uses. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to consistency with plans and policies.

Conflict with Conservation Plans. No Habitat Conservation Plan or Natural Community Conservation Plan has been identified within the Study Area. The Study Area is located in a largely urbanized area and is not within a designated wildlife habitat areas or Open Space/Conservation Program. Therefore, Streetcar Alternatives 1 and 2 would result in no impacts related to conservation plans.

Agricultural, Farmland, and Forest Land. There are no agricultural, timberland, or forestry resources within the Study Area. Streetcar Alternatives 1 and 2 would not convert farmland to non-agricultural use; conflict with zoning for agricultural use, forest land, or timberland; conflict with Williamson Act contracts; or result in the loss or conversion of forest land to non-forest use. Therefore, Streetcar Alternatives 1 and 2 would result in no impacts related to agricultural resources, farmland, and forestry resources.

IOS-1 and IOS-2

As discussed in Section 3.2.2.4 above, IOS-1 and IOS-2 would not comply with the City of Santa Ana General Plan policies as well as Streetcar Alternatives 1 and 2 would comply with those policies. The termination of IOS-1 and IOS-2 at Raitt Station would be in an industrially-zoned area, and would not support the City of Santa Ana General Plan goals of providing circulation and encouraging development that supports surrounding land use, as well as Streetcar Alternatives 1 and 2. Additionally, IOS-1 and IOS-2 would not provide as

much connection and development potential as Streetcar Alternatives 1 and 2. Notwithstanding the above, IOS-1 and IOS-2 would not conflict with adopted plans and policies. Therefore, they would result in less-than-significant impacts related to the City of Santa Ana General Plan.

As discussed in Section 3.2.2.4 above, IOS-1 and IOS-2 alignments would not be within the limits of the City of Garden Grove, and consequently, applicable land use and zoning plans would not be affected. Therefore, IOS-1 and IOS-2 would result in no impacts related to the City of Garden Grove General Plan and Land Use Code. It should be noted, however, that because IOS-1 and IOS-2 would not provide a connection to Harbor Boulevard, they would not support Garden Grove's future development plans as well as Streetcar Alternatives 1 and 2.

As discussed in Section 3.2.2.4 above, IOS-1 and IOS-2 alignments traverse the same land uses as Streetcar Alternatives 1 and 2. Therefore, IOS-1 and IOS-2 would result in less-than-significant impacts related to surrounding land uses.

3.2.4.2 Significance After Mitigation

Impacts related to land use and zoning and agricultural and forestry resources were determined to be less than significant. No mitigation measures are required.

3.3 Land Acquisition and Displacements

This section provides an overview of potential land acquisition, potential displacement and associated economic effects and was prepared utilizing the Community Impact Assessment included as Appendix C. The analysis is based on the affected environment and project features, and evaluates operational impacts associated with the proposed project. Land acquisitions are discussed as full or partial acquisitions. Full parcel acquisitions are those which would acquire the entire parcel for the project, while partial parcel acquisitions would acquire only a portion of the parcel. Both full and partial acquisitions could result in the displacement of residences, businesses, or public facilities from the parcel.

3.3.1 Affected Environment

During the early to mid-1990s, Southern California saw an increase in housing development, which resulted in increased construction jobs and associated service jobs. However, the current economic recession has hindered regional economic growth. **Table 3.3-1** shows the existing and projected regional employment for 2011 and 2035. The change in employment would vary greatly at the county level and most counties are expected to gain employment. The greatest increase in the number of projected employees is expected to occur in Los Angeles County (508,100 employees) and the greatest increase of projected employment growth by percent is expected to occur in Imperial County (122 percent).

According to the California Employment Development Department, which prepares labor force and employment estimates for California counties, Orange County's civilian labor force averaged 1,603,700 in 2011, of which 162,000 resided in the City of Santa Ana (10 percent) and 85,300 resided in the City of Garden Grove (3.3 percent). Unemployment

rates in Orange County, the City of Santa Ana, and the City of Garden Grove as of June 2012, were approximately 7.5 percent, 11.4 percent and 9.4 percent, respectively.

TABLE 3.3-1: 2011 AND 2035 EMPLOYMENT LEVELS IN THE SCAG REGION		
County	2011 Employees	2035 Employees
Imperial	54,500	121,000
Los Angeles	4,318,900	4,827,000
Orange	1,464,400	1,779,000
Riverside	810,600	1,243,000
San Bernardino	747,100	1,059,000
Ventura	298,200	411,000
SCAG Region	7,693,700	9,441,000

Source: Southern California Association of Governments, 2012 Integrated Growth Forecast, retrieved from <http://www.scag.ca.gov/forecast/index.htm> on August 6, 2012.

Employment by industries located in the City of Santa Ana include (listed in order of prevalence): professional and management (19.8 percent), education and health (17.7 percent), manufacturing (13.8 percent), retail trade (8.0 percent), leisure and hospitality (7.2 percent), public administration (5.7 percent), wholesale (5.6 percent), construction (4.9 percent), transportation (3.9 percent) and others (13.4 percent). Major employers in the City of Santa Ana include TTM Technologies Inc. (manufacturing), Tenet Health system Medical Inc. (education and health), DMS - Services LLC (professional and management), Freedom Communications Inc. (leisure and hospitality), Ponderosa Builders Inc. (construction), Alan B. Whitson Company Inc.(professional and management), Aluminum Precision Products Inc.(manufacturing), Brasstech Inc (manufacturing).¹² According to the 2010 Census, the average annual salary per employed person living in the City of Santa Ana was \$16,613, and the median household income was \$54,877.

In the City of Garden Grove, the major employment sectors are education and health (25.0 percent), professional management (14.1 percent), leisure and hospitality (7.2 percent), manufacturing (12.3 percent), and retail trade (10.8 percent). Major employers in the City of Garden Grove include Air Industries Corp (manufacturing), Prime Health Care Services (education and health), Driessen Aircraft Interior Systems (manufacturing), St. Gobain Performance Plastics (manufacturing), OfficeMax Inc. (retail trade), and the Hyatt Regency of Orange County (leisure and hospitality).¹³ According to the 2010 U.S. Census, the average annual salary per employed person living in the City of Garden Grove was \$20,971, and the median household income was \$61,026.

The revenue supporting Orange County government operations and programs comes from many sources, including property taxes, licenses and permits, fines and intergovernmental

¹² City of Santa Ana, Community Development Agency, February 2010.

¹³ City of Garden Grove, Business Statistics and Information, retrieved from <http://www.ci.gardengrove.ca.us/?q=econdev/business/statistics> on July 16, 2012.

revenue. As shown in **Table 3.3-2**, property taxes comprise approximately 92 percent of the Orange County General Fund in the 2012-2013 fiscal year.

TABLE 3.3-2: COUNTY OF ORANGE GOVERNMENT REVENUE					
County	Property Tax Revenue	Percent of Total	General Fund Revenue	Percent of Revenue	Total Adopted Budget
Orange	\$601,400,000	92%	\$3,089,412,817	55%	\$ 5,622,408,929

Source: County of Orange, 2012-2013 Fiscal Year Budget, July 2012.

Employment figures and projections for the Cities of Garden Grove and Santa Ana are presented in **Table 3.3-3**. Employment in the City of Garden Grove is projected to increase by 2,772 employees (or 5.9 percent) and the City of Santa Ana is expected to decrease by 4,789 employees or (3.1 percent).

TABLE 3.3-3: SUMMARY OF EMPLOYMENT GROWTH				
City	Year 2010 Employees	Year 2035 Employees	2010 – 2035 Change Employees	% Change
Garden Grove	47,028	49,800	2,772	5.9%
Santa Ana	154,189	149,400	(4,789)	(3.1%)

Source: Southern California Association of Governments, 2012 Integrated Growth Forecast, retrieved from <http://www.scag.ca.gov/forecast/index.htm> on August 6, 2012.

The revenue supporting local government operations and programs comes from many sources typical to local governments. These sources include business licenses, recreation facility user fees, sales tax, hotel room tax and property taxes. Some revenues can only be spent on certain projects or types of programs. For example, revenues raised via property taxes for a special tax district can only be used for specified purposes and cannot be used to support other local government activities. Other local government revenue can be spent on a broad range of government activities. For example, revenues collected by sales tax support a local government’s General Fund.

Typically, a substantial share of government revenue for the General Fund is from property taxes. As shown in **Table 3.3-4**, property taxes comprised 19.4 percent of the City of Garden Grove’s General Fund in the 2011-2012 fiscal year and approximately 14.3 percent of the City of Santa Ana’s General Fund in the 2012-2013 fiscal year.

TABLE 3.3-4: LOCAL GOVERNMENT REVENUES					
City	Property Tax Revenues	Percent of Total	General Fund Revenues	Percent of Revenues	Total Adopted Budget
Garden Grove	\$17,300,000	19.4%	\$88,949,900	91.4%	\$97,340,500
Santa Ana	\$28,064,495	14.3%	\$196,497,775	50.4%	\$409,856,985

Source: City of Garden Grove, 2011-2012 Budget, retrieved from http://www.ci.gardengrove.ca.us/internet/pdf/finance/2011-2012_citybudget.pdf on July 12, 2012; City of Santa Ana, 2012-2013 Budget, retrieved from http://www.santa-ana.org/finance/budget/2012-13/documents/2012-13_budget_summary.pdf on July 12, 2012.

3.3.2 Environmental Consequences

3.3.2.1 No Build Alternative

The No Build Alternative includes existing conditions within the Study Area and adds future planned and funded transit and roadway improvement projects. Each of these future projects will be environmentally cleared through separate project-specific environmental documentation. The proposed project would not operate under this alternative and there would not be project-related land acquisition and displacement impacts. Therefore, the No Build Alternative would not result in adverse effects related to land acquisitions, displacement, and the local and regional economy.

3.3.2.2 TSM Alternative

The TSM Alternative emphasizes low-cost improvements and operational efficiencies, such as focused traffic engineering actions, expanded bus service, and improved access to transit services. It may include some minor physical enhancements, such as improvements to transit stop amenities (e.g., bus benches). These minor improvements would have no impacts to land acquisitions and would have no or negligible impacts to displacement and the local and regional economy. Therefore, the TSM Alternative would not result in adverse effects related to land acquisitions, displacement, and the local and regional economy.

3.3.2.3 Streetcar Alternatives 1 and 2

Full Land Acquisition and Displacement

All full parcel acquisitions under Streetcar Alternative 1 or 2 would be related to the O & M Facility Sites except for one location. Implementation of Streetcar Alternative 2 would require the full acquisition of a Burger King fast food restaurant located at 701 Main Street in the City of Santa Ana. This parcel would be used for a station platform and additional ROW. Streetcar Alternative 1 would not result in full parcel acquisitions unrelated to the O & M Facility Sites. The selection of O & M Facility Site A would require full acquisition of one existing recycling facility located at 1035 4th Street in the City of Santa Ana. The selection of O & M Facility Site B would require full acquisition of one existing recycling facility located at 2006 5th Street in Santa Ana and one residential parcel also located at 2006 5th Street containing six multi-family housing structures. **Figures 3.3-1** through **3.3-4** show the locations of both the full and partial parcel acquisitions listed in **Table 3.3-5**. The full parcel acquisitions are summarized below:

- One commercial parcel located at 701 Main Street – Streetcar Alternative 2
- One industrial parcel located at 1035 4th Street – O & M Facility Site A
- Two industrial parcels located at 2006 5th Street – O & M Facility Site B
- One residential parcel located at 2006 5th Street – O & M Facility Site B



Land Acquisitions - Streetcar Alternatives 1 and 2: Study Area



LEGEND:

Study Area	Streetcar Alternative 1	Full Acquisition Site
PE ROW	Streetcar Alternative 2	Partial Acquisition Site
Metrolink/Amtrak Rail Line	Potential Maintenance Facility Site	Station Locations

0 1500 3000 FEET

Source: 2010 US Census, ESRI & Terry A. Hayes Associates Inc. August 2012.

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Land Acquisitions - Streetcar Alternatives 1 and 2: PE ROW



LEGEND:

- Streetcar Alternative 1 and 2
- ▬ Station Locations - Streetcar Alternative 1 and 2
- ▭ Potential Facility (Site B)
- ▲ Partial Acquisition Site - Streetcar Alternative 1
- ▲ Full Acquisition Site - Streetcar Alternative 1
- Partial Acquisition Site - Streetcar Alternative 2
- Full Acquisition Site - Streetcar Alternative 2
- # Acquisition Site Assessor Parcel Number

APPROX. SCALE 0 350 700 FEET

Source: 2010 US Census, ESRI & Terry A. Hayes Associates Inc. August 2012.

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Land Acquisitions - Streetcar Alternatives 1 and 2: Raitt to Flower



LEGEND:

----- Streetcar Alternative 1 and 2	Station Locations - Streetcar Alternative 1
— Streetcar Alternative 1	Station Locations - Streetcar Alternative 2
— Streetcar Alternative 2	▲ Partial Acquisition Site - Streetcar Alternative 1
# Acquisition Site Assessor Parcel Number	▲ Full Acquisition Site - Streetcar Alternative 1
	● Partial Acquisition Site - Streetcar Alternative 2
	● Full Acquisition Site - Streetcar Alternative 2

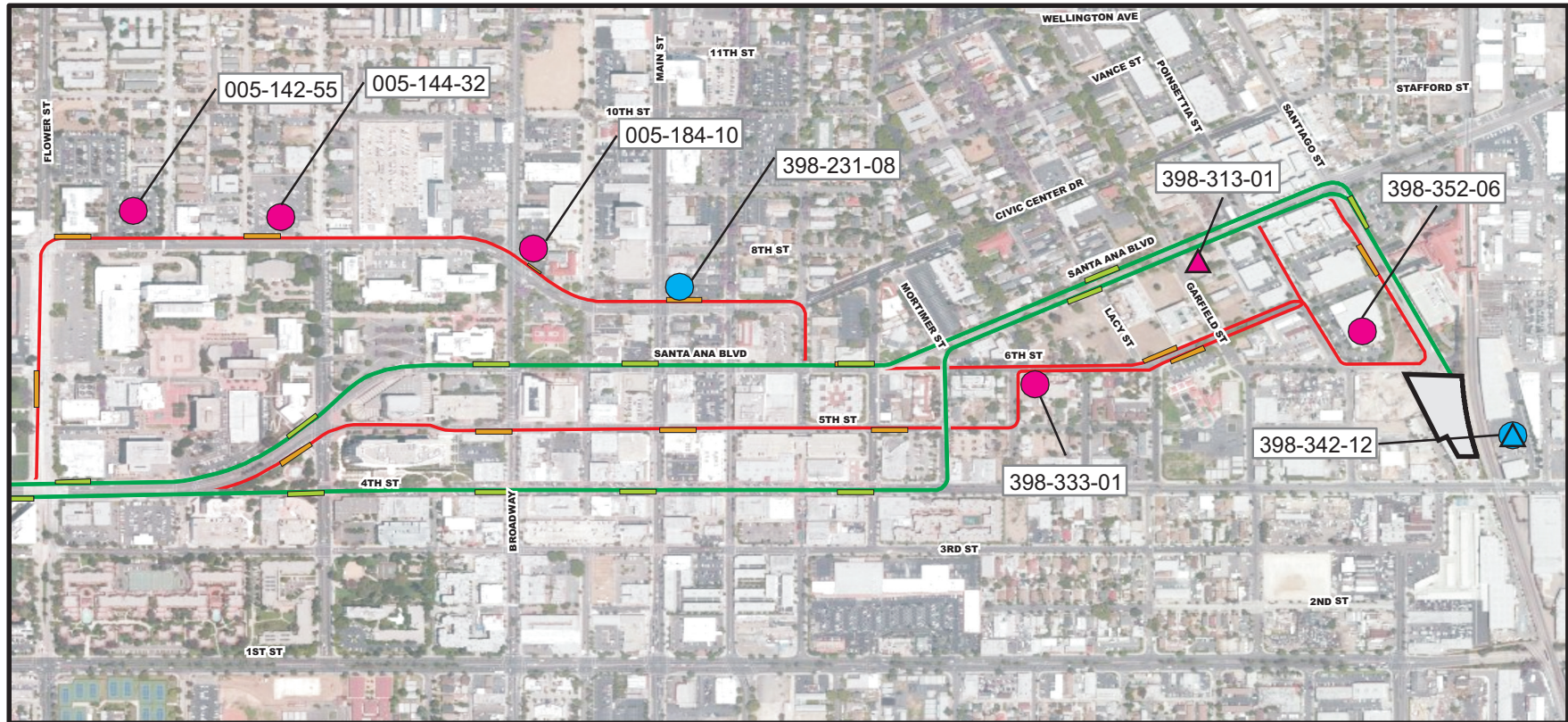
APPROX. SCALE 0 350 700 FEET

Source: 2010 US Census, ESRI & Terry A. Hayes Associates Inc. August 2012.

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Land Acquisitions - Streetcar Alternatives 1 and 2: East of Flower



LEGEND:

Streetcar Alternative 1	Station Locations - Streetcar Alternative 1
Streetcar Alternative 2	Station Locations - Streetcar Alternative 2
Potential Maintenance Facility (Site A)	Partial Acquisition Site - Streetcar Alternative 1
Acquisition Site Assessor Parcel Number	Full Acquisition Site - Streetcar Alternative 1
APPROX. SCALE	Partial Acquisition Site - Streetcar Alternative 2
NORTH	Full Acquisition Site - Streetcar Alternative 2

Source: 2010 US Census, ESRI & Terry A. Hayes Associates Inc. August 2012.

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TABLE 3.3-5: REQUIRED LAND ACQUISITIONS

Street Address	APN	Type of Acquisition	Current Use	Parcel Size (Square Feet)	Assessed Tax /b/
STREETCAR ALTERNATIVE 1					
1035 E. 4 th St., SA (O & M Site A Only)	398-342-12	Full	Recycling Facility	95,832	\$29,077.96
2006 W. 5 th St., SA (Mailing Address) (O & M Site B Only)	007-110-17	Full	Multi-Family Residential	22,294	\$752.59
2006 W. 5 th St., SA (Mailing Address) (O & M Site B Only)	007-100-04	Full	Recycling Center	37,260	\$5,317.27
2006 W. 5 th St., SA (Mailing Address) (O & M Site B Only)	007-100-05	Full	Recycling Center	44,989	\$6,420.09
3526 Westminster Ave., SA	198-091-55	Partial	Chief Eagle Building Materials	1,088	\$13,237.09
1424 N. Susan St., SA	198-211-01	Partial	Simis Precision Machining	300	\$5,213.40
2234 W. 9 th St., SA	004-153-01	Partial	Single-Family Residential	650	\$3,021.10
811 N. Fairview St., SA	004-153-18	Partial	Commercial	100	\$11,125.60
1503 W. Santa Ana Blvd., SA	405-062-05	Partial	Commercial	300	EXEMPT
625 N. Garfield St., SA	398-313-01	Partial	Vacant Lot	300	\$1,938.30
STREETCAR ALTERNATIVE 2					
701 N. Main St., SA	398-231-08	Full	Burger King	18,719	\$13,013.04
1035 E. 4 th St., SA (O & M Site A Only)	398-342-12	Full	Recycling Facility	95,832	\$29,077.96
2006 W. 5 th St., SA (Mailing Address) (O & M Site B Only)	007-110-17	Full	Multi-Family Residential	22,294	\$752.59
2006 W. 5 th St., SA (Mailing Address) (O & M Site B Only)	007-100-04	Full	Recycling Center	37,260	\$5,317.27
2006 W. 5 th St., SA (Mailing Address) (O & M Site B Only)	007-100-05	Full	Recycling Center	44,989	\$6,420.09
3526 Westminster Ave., SA	198-091-55	Partial	Chief Eagle Building Materials	1,088	\$13,237.09
1424 N. Susan St., SA	198-211-01	Partial	Simis Precision Machining	300	\$5,213.40
2234 W. 9 th St., SA	004-153-01	Partial	Single-Family Residential	650	\$3,021.10
811 N. Fairview St., SA	004-153-18	Partial	Commercial	100	\$11,125.60
1503 W. Santa Ana Blvd., SA	405-062-05	Partial	Commercial	300	EXEMPT
801 W. Civic Center Dr., SA	005-142-55	Partial	Office	1,100	\$201,118.04
821 N. Van Ness Ave., SA	005-144-32	Partial	Parking Lot	580	\$7,750.76
801 N. Broadway, SA	005-184-10	Partial	School/Office	730	EXEMPT
602 E. 6 th St., SA	398-333-01	Partial	Vacant Lot	360	\$7,302.45
610 N. Santiago St., SA	398-352-06	Partial	Austin Hardwoods and Hardware	1,500	\$46,320.21
IOS-1					
1035 E. 4 th St., SA (O & M Site A Only)	398-342-12	Full	Recycling Facility	95,832	\$29,077.96

TABLE 3.3-5: REQUIRED LAND ACQUISITIONS

Street Address	APN	Type of Acquisition	Current Use	Parcel Size (Square Feet)	Assessed Tax /b/
2006 W. 5 th St., SA (Mailing Address) (O & M Site B Only)	007-110-17	Full	Multi-Family Residential	22,294	\$752.59
2006 W. 5 th St., SA (Mailing Address) (O & M Site B Only)	007-100-04	Full	Recycling Center	37,260	\$5,317.27
2006 5 th St., SA (Mailing Address) (O & M Site B Only)	007-100-05	Full	Recycling Center	44,989	\$6,420.09
1503 W. Santa Ana Blvd., SA	405-062-05	Partial	Commercial	300	EXEMPT
625 N. Garfield St., SA	398-313-01	Partial	Vacant Lot	300	\$1,938.30
IOS-2					
701 Main St., SA	398-231-08	Full	Burger King	18,719	\$13,013.04
1035 4 th St., SA (O & M Site A Only)	398-342-12	Full	Recycling Facility	95,832	\$29,077.96
2006 W. 5 th St., SA (Mailing Address) (O & M Site B Only)	007-110-17	Full	Multi-Family Residential	22,294	\$752.59
2006 W. 5 th St., SA (Mailing Address) (O & M Site B Only)	007-100-04	Full	Recycling Center	37,260	\$5,317.27
2006 5 th St., SA (Mailing Address) (O & M Site B Only)	007-100-05	Full	Recycling Center	44,989	\$6,420.09
1503 Santa Ana Blvd., SA	405-062-05	Partial	Commercial	300	EXEMPT
801 Civic Center Dr., SA	005-142-55	Partial	Office	1,100	\$201,118.04
821 Van Ness Ave., SA	005-144-32	Partial	Parking Lot	580	\$7,750.76
801 Broadway, SA	005-184-10	Partial	School/Office	730	EXEMPT
602 6 th St., SA	398-333-01	Partial	Vacant Lot	360	\$7,302.45
610 Santiago St., SA	398-352-06	Partial	Austin Hardwoods and Hardware	1,500	\$46,320.21

/a/ Values derived from the Orange County Assessor 2011-2012 Secured Assessment Roll.

/b/ Calculated using 1.10663 (2011-2012 Property Tax Rate).

Source: Cordoba Corporation, 2012.

Acquisitions requiring the displacement of existing residential uses or businesses would comply with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act). All relocations would include relocation assistance and compensation to displaced residences and businesses per the Uniform Act, pursuant to 49 CFR Part 24 and the California Relocation Act to minimize adverse effects to the businesses and residences. All real property acquired would be appraised to determine its fair market value. Just compensation, which shall not be less than the approved appraisal made to each property owner, would be offered. Each homeowner, renter, business, or nonprofit organization displaced as a result of the project would be given advanced written notice and would be informed of the eligibility requirements for relocation assistance and payments. The potentially affected businesses are not unique; there are other businesses like them in Santa Ana and Central Orange County. In addition, there are hundreds of acres of industrial-zoned land in Central Orange County where they might be able to relocate. Therefore, Streetcar Alternatives 1 and 2 would not have an adverse effect related to full land acquisitions and displacement.

The termination or non-renewal of an existing lease within the PE ROW would not entail property acquisition. However, business displacements may result where all or a majority of business operations occur on the leased property. Business displacements may also occur at those locations where the leased property is used for ancillary or support operations, such as access or parking, and the loss of such property would have a substantial impact on the associated business operation. Tenants and locations where leases would be terminated include:

- Sun Pacific Systems, Inc. on Raitt Street;
- Caldwell's Auto Body and Towing (MNP Automotive, Inc.) at 1519 Fairview Street;
- Temple Calvario (parking area) at 2501 5th Street;
- Clear Channel Outdoor, Inc. on Fairview Street, 5th Street, and the Westminster Avenue/Harbor Boulevard Intersection;
- Calco International at 711 Fairview Street;
- Robertson's Ready Mix at 310 Townsend Street; and
- MAS Investments, L.P. (Harbor West, LLP) at Westminster Avenue/Harbor Boulevard Intersection.

Streetcar Alternatives 1 and 2 would result in OCTA's terminating the lease with an auto dealership at the western terminus and would displace temporary parking in the PE ROW for an adjacent church. OCTA leases a portion of the ROW to Itamex Motors (located at 12071 Westminster Avenue in Garden Grove) to operate an automobile dealership, which would be terminated upon implementation of Streetcar Alternatives 1 and 2. Itamex Motors would be served with a 30-day "notice to vacate," per the terms of their lease with OCTA. Additionally, OCTA allows Templo Calvario Church (located at 501 5th Street in Santa Ana) to park within the PE ROW on a temporary basis with a 30-day "notice to vacate" provision. The Conditional Use Permits (CUPs) granted to Templo Calvario Church by the City of Santa Ana indicate that overflow parking should use street parking, as well as available parking at nearby facilities (not in the PE ROW). It is anticipated that these facilities would be able to

accommodate the church's parking volumes, consistent with the information presented to the City when the CUPs were granted. As discussed above, all of the displaced uses located within the PE ROW would be given a 30-day "notice to vacate." Therefore, displacement of these uses would not have an adverse effect related to displacement of leased properties.

Partial Parcel Acquisitions

Implementation of Streetcar Alternatives 1 and 2 would require partial acquisitions associated with minor street improvements, installation of electrical substations, and refinements consisting of roadway modifications to allow for the provision of the streetcars and driveway, bus bay, and sidewalk modifications, where the alignment would conflict with auto, bus, and/or pedestrian traffic. Figures 3.3-1 through 3.3-4 show the locations of the partial parcel acquisitions listed in Table 3.3-5.

Partial acquisitions under both alternatives include portions of the following land uses and parcels in the City of Santa Ana:

- One commercial parcel located at 1503 West Santa Ana Boulevard
- One commercial parcel located at 3526 Westminster Avenue
- One commercial parcel located at 811 North Fairview Street
- One industrial parcel located at 1424 North Susan Avenue
- One single-family residential parcel located at 2234 West 9th Street

Streetcar Alternative 1 would require the partial acquisition of a vacant lot land uses and parcel located at 625 North Garfield Street in the City of Santa Ana. Streetcar Alternative 2 would require partial acquisitions of the following land uses and parcels in the City of Santa Ana:

- One office located at 801 West Civic Center Drive
- One parking lot located at 821 North Van Ness Avenue
- One school and office building located at 801 North Broadway Avenue
- One vacant lot located at 602 East 6th Street
- One lumber and hardware store located at 610 North Santiago Street

The partial parcel acquisitions required for Streetcar Alternatives 1 and 2 would not displace businesses, residences, or employees; would not alter access to existing businesses or residences; and would not alter the economic viability of existing businesses. Owners of property requiring partial parcel acquisitions would be compensated for the lost property. Therefore, Streetcar Alternatives 1 and 2 would not have an adverse effect related to partial land acquisitions.

Economic Effects

Compared to the total amount of property tax revenue for the County of Orange and the Cities of Santa Ana and Garden Grove, property acquisitions for ROW required by the project would lead to relatively minimal property tax revenue loss. Property tax estimates for parcels that have been identified for possible full or partial acquisitions under each build alternative are provided in Table 3.3-4, above. These estimates were calculated using 2011-2012 property values taken from the Orange County Assessor's Secured Assessment Roll.

Minimum and maximum revenue losses for each alternative are calculated and summarized in **Table 3.3-6**. Based on the 2011-2012 property tax estimates, Streetcar Alternatives 1 and 2 would not result in property tax losses in excess of less than 0.1 percent of the County of Orange’s tax base, which is approximately \$476 million in property tax revenues during the 2010-2011 fiscal year.

TABLE 3.3-6: PROPERTY TAX REVENUE LOSSES		
Build Alternative	Total Revenue Losses /a/	
	Minimum Loss /b/	Maximum Loss /c/
Streetcar 1	\$63,293.87	\$79,881.89
IOS-1	\$14,428.24	\$31,016.26
Streetcar 2	\$336,109.07	\$353,448.08
IOS-2	\$66,112.61	\$304,582.47

/a/ Based on parcel reference numbers and assessed tax values provided in Table 3.3-1, above.

/b/ Minimum revenue loss reflects the design option selections that would require acquisition of parcels with the lowest estimated tax assessments.

/c/ Maximum revenue loss reflects the design option selections that would require acquisition of parcels with the highest estimated tax assessments.

Source: Cordoba Corporation, 2012.

As the total amount of privately-owned parcels identified as full or partial acquisitions is considered relatively small to the property inventory in the Study Area, the resulting loss of property tax revenues currently being generated by the these properties for the cities, County, and other local agencies would be considered minimal and short-term. Therefore, the estimated property tax losses are not expected to have an adverse effect on Orange County or the affected Cities of Santa Ana and Garden Grove.

Employment Effects

Based on capital expenditures, the proposed project is expected to create approximately 250 direct jobs during the entire construction process (100 jobs annually) and 400 direct jobs during operation of the project.¹⁴ Job loss may occur within the Study Area to businesses on the acquired parcels that are permanently closed or relocated beyond the local jurisdictions. Streetcar Alternative 1 could result in a worst-case loss of approximately 30 to 35 jobs depending on whether O & M Facility Sites A or B is selected. Streetcar Alternative 2 could result in a worst-case loss of approximately 45 to 50 jobs depending on whether O & M Facility Sites A or B is selected. The additional job loss under Streetcar Alternatives 2 results from the acquisition of the Burger King site on Main Street. As discussed under Full Land Acquisitions and Displacement, acquired businesses would be provided relocation benefits which include assisting the business owners with finding a similar facility as close to their existing business as possible. Also, as discussed in the Community Impact Assessment included as Appendix C, there are several similar business properties that are available and employment opportunities in the community where the affected businesses and workers could relocate. Therefore, Streetcar Alternatives 1 and 2 would not have adverse effects related to employment.

¹⁴ EDRG and American Public Transportation Association, Job Impacts of Spending on Public Transportation, April 2009; Bureau of Economic Analysis, 2005 RIM II Modeling System, EDRG.

3.3.2.4 IOS-1 and IOS-2

Parcels and their associated land uses identified for acquisition have been inventoried and are listed in Table 3.3-5, above. Under IOS-1, property acquisitions would be similar to those identified under Streetcar Alternative 1, except for parcels with Reference Nos. A1-1 through A1-6 would not be acquired. Under IOS-1, a maximum of two partial and three full acquisitions would be required. Under IOS-2, property acquisitions would be similar to those identified under Streetcar Alternative 2, except for parcels with Reference Nos. A2-1 through A2-6 would not be acquired. Under IOS-2, a maximum of six partial and three full acquisitions would be required.

Acquisitions requiring the displacement of existing residential uses or businesses would comply with the Uniform Act to ensure that the adverse effects to displaced residences and businesses are minimized. Therefore, IOS-1 and IOS-2 would not have an adverse effect related to full land acquisitions and displacement.

IOS-1 and IOS-2 would also affect property taxes and employment. Minimum and maximum revenue losses for each alternative are calculated and summarized in Table 3.3-6, above. Based on the 2011-2012 property tax estimates, IOS-1 and IOS-2 would not result in property tax losses in excess of 0.1 percent of the County of Orange's tax base. In addition, it is not anticipated that implementation of the proposed project would substantially affect employment. Therefore, IOS-1 and IOS-2 would not have adverse effects related to property taxes and employment.

3.3.3 Measures to Minimize Harm

Operational effects related to land acquisition and displacement would not be adverse. No measures to minimize harm are necessary.

3.3.4 CEQA Determination

3.3.4.1 Significance Criteria and Significance Criteria Application

In accordance with Appendix G of the State CEQA Guidelines, the proposed project would have a significant impact related to population and housing if it would:

- Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere; and/or
- Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere.

No Build Alternative

As discussed in Section 3.3.2.1 above, the No Build Alternative takes existing conditions within the Study Area and adds future planned and committed transit and roadway improvement projects. Under the No Build Alternative, the fixed guideway system would not be constructed. Although the future planned and committed transit and roadway improvement projects included under the No Build Alternative would improve access throughout the Study Area and region, these improvements would not result in substantial population growth or displacement of a substantial number of people or existing housing that would necessitate the construction of replacement housing. Therefore, the No Build Alternative would result in no impacts related to population and housing.

TSM Alternative

As discussed in Section 3.3.2.2 above, the TSM Alternative includes minor modifications and enhancements to selected bus routes, intersection and signal improvements, and bus stop amenity upgrades. Transit network and system operational improvements would improve access throughout the Study Area and region using the existing transportation infrastructure. Improved access due to the implementation of the TSM Alternative would not induce substantial population growth in the Study Area or surrounding region. The TSM Alternative would occur within existing ROW, and consequently would not result in the displacement of a substantial number of people or existing housing that would necessitate the construction of replacement housing. Therefore, the TSM Alternative would result in no impacts related to population and housing.

Streetcar Alternatives 1 and 2

Housing Displacement. As discussed in Section 3.3.2.3 above, Streetcar Alternatives 1 and 2 would require one private property acquisition resulting in residential displacement. The development of O & M Facility Site B would require a full parcel acquisition of six multi-family residential units located at 2006 5th Street in the City of Santa Ana. Based on a population per household of 4.7, this would displace approximately 28 people in the City of Santa Ana. Given the length of the four-mile alignment and the City of Santa Ana population of over 58,000 within the Study Area, the displacement of 28 people (less than 0.5 percent) would not be considered substantial.

Acquisitions requiring the displacement of existing residential uses, as identified above, would comply with the Uniform Act. The Streetcar Alternatives 1 and 2 would provide relocation assistance and compensation to displaced residences per the Uniform Act. Compensation would not be less than the approved appraisal of the property. Streetcar Alternatives 1 and 2 would not result in the displacement of substantial housing and would result in less-than-significant impacts related to housing displacement.

Population Displacement. As discussed in Section 3.3.2.3 above, Streetcar Alternatives 1 and 2 would require housing acquisition resulting in displacement of approximately 28 persons. In addition, acquisition would affect fewer than a dozen businesses which would displace no more than 50 jobs. Due to the small amount of housing and business

displacement (less than one percent of the Study Area population), the number of persons displaced would be minimal compared to the existing population. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to population displacement.

IOS-1 and IOS-2

As discussed in Section 3.3.2.4 above, housing and population displacement from the implementation of IOS-1 and IOS-2 would be similar to those identified for Streetcar Alternatives 1 and 2, except for the single-family residence located at 2234 9th Street, which would not require partial acquisition. IOS-1 and IOS-2 would comply with the Uniform Act during the acquisition process. Therefore, IOS-1 and IOS-2 would result in less-than-significant impacts related to population and housing.

3.3.4.2 Significance After Mitigation

Impacts related to housing and population displacement were determined to be less than significant. No mitigation measures are required.

3.4 Section 4(f) Resources

This section provides an overview of Section 4(f) Resources and was prepared utilizing the Section 4(f) Evaluation Technical Report included as Appendix D. The analysis is based on the affected environment and project features, and evaluates operational impacts associated with the proposed project. Section 6(f) does not apply as no parks or recreational properties funded through the Land and Water Conservation Fund would be acquired or improved.

3.4.1 Affected Environment

Section 4(f) (49 USC 303) of the Department of Transportation Act of 1966 applies to publicly owned parks, recreation areas, and wildlife and waterfowl refuges and publicly or privately owned significant historic properties. Section 4(f) prohibits the approval of Federal transportation projects that use publicly owned parks, recreation areas, wildlife and waterfowl refuges, or historic sites unless there is no feasible and prudent alternative and the project includes all possible planning to minimize harm. Under 23 CFR 774.3, Section 4(f) Approvals, the use of Section 4(f) property may not be approved unless the use of the property, including any measure(s) to minimize harm (such as any avoidance, minimization, mitigation, or enhancement measures) committed to by the applicant will have a *de minimis* impact. *De minimis* impact is defined in 23 CFR 774.17 as follows:

- For parks, recreation areas, and wildlife and waterfowl refuges, a *de minimis* impact is one that would not adversely affect the features, attributes, or activities qualifying the property for protection under Section 4(f); and
- For historic sites, *de minimis* impact means that the FTA has determined, in accordance with 36 CFR Part 800, that no historic property is affected by the project or the project would have “no adverse effect” on the property in question.

Section 4(f) declares that “It is hereby declared to be the policy of the United States Government that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites.” Section 4(f) properties include:

- Publicly-owned parks open to the entire public during its hours of operation
- Publicly-owned recreational areas open to the entire public during its hours of operation
- Publicly-owned wildlife or waterfowl refuges
- Historic sites on or eligible for the National Register of Historic Places
- Archaeological sites on or eligible for the National Register of Historic Places and which warrant preservation in place

As defined in 23 CFR Section 774.17, the use of a protected Section 4(f) resource occurs when any of the following conditions are met:

- Land is permanently incorporated into a transportation facility (direct use);
- There is a temporary occupancy of land that is adverse in terms of the statute's preservation purposes (temporary occupancy); or
- There is a constructive use of a Section 4(f) property (constructive use).

Direct Use. A direct use of a Section 4(f) resource takes place when the property is permanently incorporated into a proposed transportation facility/project. This may occur as a result of partial or full acquisition of a property, permanent easements, or temporary easements that exceed regulatory limits.

Temporary Occupancy. A temporary occupancy of a Section 4(f) resource occurs when the temporary use of property is considered adverse in terms of the preservationist purposes of the Section 4(f) statute. A temporary occupancy of property does not constitute a use of a Section 4(f) resource when the following conditions are satisfied:

- The occupancy must be of temporary duration (i.e., shorter than the period of construction) and not involve a change in ownership of the property;
- The scope of work must be minor, with only minimal changes to the protected resource;
- There are no permanent adverse physical effects on the protected resource, and there would be no temporary or permanent interference with the activities or purpose of the resource;
- The property being used must be fully restored to a condition that is at least as good as that which existed prior to the project; and
- There must be documented agreement of the appropriate officials having jurisdiction over the resource regarding the foregoing requirements.

Constructive Use. A constructive use of a Section 4(f) resource occurs when a transportation project does not permanently incorporate land from the resource, but the proximity of the project results in impacts (i.e., noise, vibration, visual, access, and/or ecological) so severe that the protected activities, features, or attributes substantially impaired. Impairment occurs

only if the protected activities, features, or attributes of the resource are substantially diminished. This determination is made through the following practices:

- Identification of the current activities, features, or attributes of the resource that may be sensitive to proximity impacts
- Analysis of the potential proximity impacts on the resource
- Consultation with the appropriate officials having jurisdiction over the resource

Resources Evaluated for Section 4(f) Applicability

Table 3.4-1 lists the identified Section 4(f) resources within the vicinity of the potential alignments. The City of Santa Ana has four schools that have recreational facilities available for joint use and are available to the public, however, only one is located within the Study Area. Spurgeon Intermediate School is located within the Study Area and was evaluated as a 4(f) resource. Table 3.4-1 summarizes the location, distance to the alignments and Section 4(f) criteria met, and the Section 4(f) applicability category.

Figure 3.4-1 shows the location of the 11 parks and recreational areas and the 8 historic and archaeological sites in the Study Area. There are no wildlife or waterfowl refuges within the Study Area.

3.4.2 Environmental Consequences

3.4.2.1 No Build Alternative

The No Build Alternative includes existing conditions within the Study Area and adds future planned and funded transit and roadway improvement projects. Each of these future projects will be environmentally cleared through separate project-specific environmental documentation. The streetcar would not operate under this alternative and there would not be project-related impacts to Section 4(f) resources. Therefore, the No Build Alternative would not result in adverse effects related to Section 4(f) resources.

TABLE 3.4-1: SECTION 4(F) RESOURCES

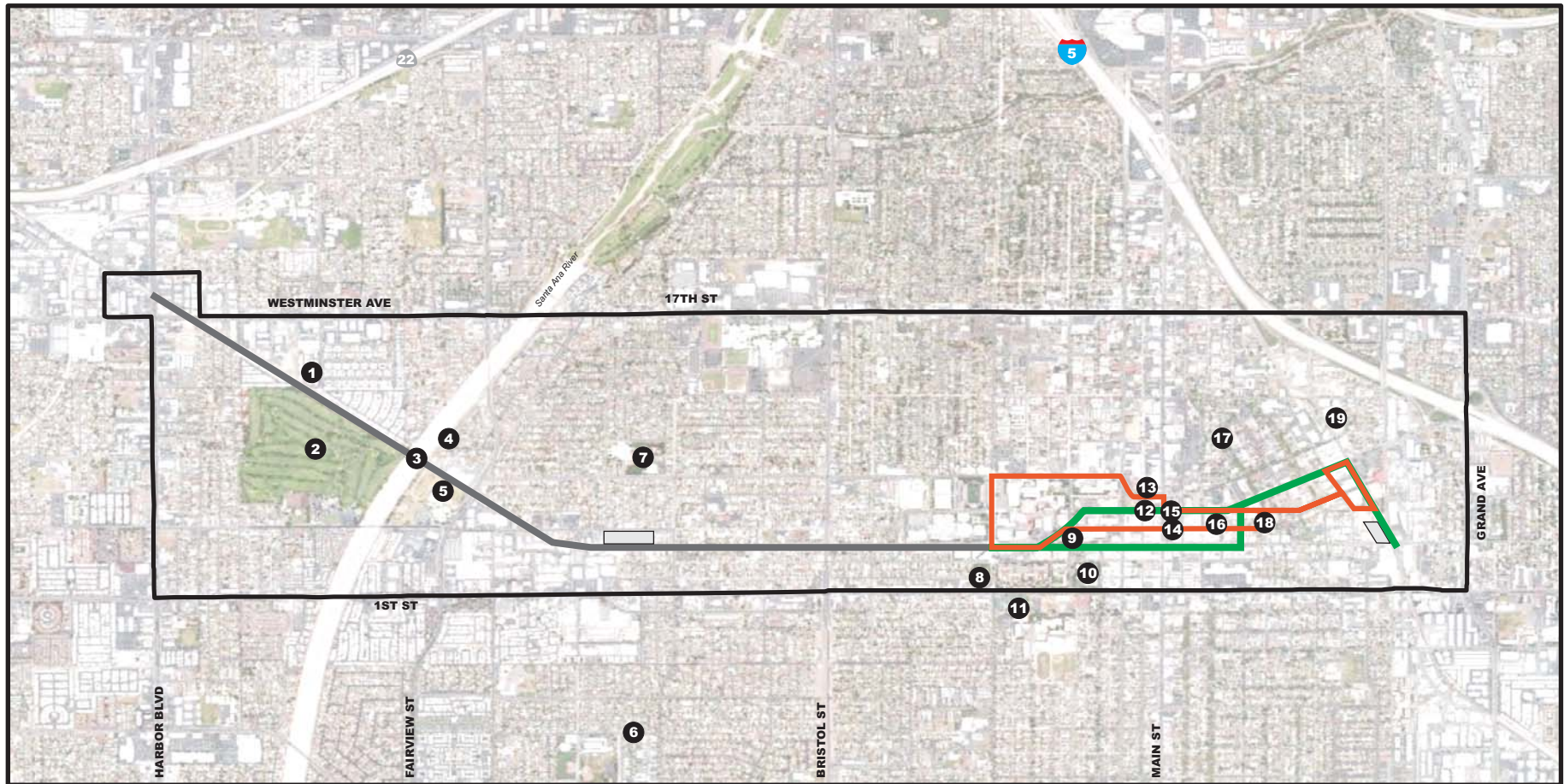
Resource Name	Location	Build Alts	Criteria/Distance	Section 4(f) Applicability
1. Quonset Huts (Cultural Report Map Reference 2) /a/	1424 N. Susan Street	1,2	National Register-Eligible. Adjacent to project.	Historic or Archaeological Site
2. Willowick Golf Course /b/	South of PE ROW	1,2	Publically owned adjacent. Fees charged for use.	Park and/or Recreation Area
3. Old Pacific Electric Santa Ana River Bridge (Cultural Report Map Reference 3) /a/	On PE ROW	1,2	National Register-Eligible. Adjacent to project.	Historic or Archaeological Site
4. Santa Ana River Trail and Bikeway/b/	Crosses PE ROW	1,2	Publically owned.	Park and/or Recreation Area
5. Spurgeon Joint Use Recreational Area	207 W. 5 th Street	1,2	Publically owned adjacent.	Recreation Area
6. Friendship Park	Myrtle and Shelley Streets	1,2	Publically owned. Beyond 500 feet.	Park and/or Recreation Area
7. El Salvador Park	10 th and Raitt Streets	1,2	Publically owned. Beyond 500 feet.	Park and/or Recreation Area
8. Angels Community Park	3 rd and Flower Streets	1,2	Publically owned. Beyond 500 feet.	Park and/or Recreation Area
9. Sasscer Park /b/	4 th and Parton Streets	1	Publically owned adjacent.	Park and/or Recreation Area
10. Birch Park	3 rd and Ross Streets	1	Publically owned. Beyond 500 feet.	Park and/or Recreation Area
11. Neal Machander Tennis Center	1 st and Flower Streets	1	Publically owned. Beyond 500 feet.	Park and/or Recreation Area
12. Orange County's Original Courthouse /a/	211 W. Santa Ana Boulevard	1	National Register-Eligible. Adjacent to project.	Historic or Archaeological Site
13. Young Men's Christian Association (YMCA) – Santa Ana-Tustin Chapter /a/	203 and 205 W. Civic Center Drive	2	National Register-Eligible. Adjacent to project.	Historic or Archaeological Site
14. First Presbyterian Church (Cultural Report Map Reference 34) /a/	600 N. Main Street	1	National Register-Eligible. Adjacent to project.	Historic or Archaeological Site
15. Howe-Waffle House and Carriage House /a/	702 Bush Street and 105 E. 17 th Street	2	National Register-Eligible. Adjacent to project.	Historic or Archaeological Site
16. First United Methodist Church (Cultural Report Map Reference 64) /a/	624 French Street	2	National Register-Eligible. Adjacent to project.	Historic or Archaeological Site
17. French Park	10 th and French Streets	2	Publically owned. Beyond 500 feet.	Park and/or Recreation Area
18. Folk Victorian-Style Duplex Cottage (Cultural Report Map Reference 58) /a/	507 N. Minter Street	1	National Register-Eligible. Adjacent to Project.	Historic or Archaeological Site
19. Chepa's Park	Stafford and Custer Streets	2	Publically owned. Beyond 500 feet.	Park and/or Recreation Area

/a/ Coordination with "Official with Jurisdiction" occurs with the State Historic Preservation Officer (SHPO_ as part of the National Historic Preservation Act Section 106 Process

/b/ Coordination with "Official with Jurisdiction" occurs directly with the owner/manager of the resource

Source: URS Corporation, Map and Field Review, July 2011.

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LEGEND: # Section 4(f) Resource

Study Area

Streetcar Alternatives 1 & 2

Streetcar Alternative 1

Streetcar Alternative 2



1. Quonset Huts (Cultural Report Map Reference 2)

2. Willowick Municipal Golf Course

3. Old Pacific Electric Santa Ana River Bridge (Cultural Report Map Reference 3)

4. Santa Ana River Trail

5. Spurgeon Joint Use Recreational Area

6. Friendship Park

7. El Salvador Park

8. Angels Community Park

9. Sasser Park

10. Brich Park

11. Neal Machander Tennis Center

12. Orange County's Original Courthouse

13. Young Men's Christian Association (YMCA) - Santa Ana-Tustin Chapter

14. First Presbyterian Church (Cultural Report Map Reference 34)

15. Howe-Waffle House and Carriage House

16. First United Methodist Church (Cultural Report Map Reference 24)

17. French Park

18. Folk Victorian-style duplex cottage (Cultural Report Map Reference 58)

19. Chepa's Park

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3.4.2.2 TSM Alternative

The TSM Alternative emphasizes low-cost improvements and operational efficiencies, such as focused traffic engineering actions, expanded bus service, and improved access to transit services. It may include some minor physical enhancements, such as improvements to transit stop amenities (e.g., bus benches). These minor improvements would have no or negligible impacts to Section 4(f) resources. Therefore, the TSM Alternative would not result in adverse effects related to Section 4(f) resources.

3.4.2.3 Streetcar Alternatives 1 and 2

Other than the Old Pacific Electric Bridge, Streetcar Alternatives 1 and 2 would not result in a direct, temporary, or constructive use of the Section 4(f) resources listed in Table 3.4-1. Prior to abandonment in 1950, the Old Pacific Electric Santa Ana River Bridge functioned as a streetcar bridge. It is now valued as a historic resource because the Pegram Truss architecture is an unusual design and the bridge was designed to improve the early infrastructure of Southern California. As a historic resource, the Santa Ana River Bridge qualifies as a Section 4(f) resource and a use would result if the bridge is acquired or if features or attributes of the bridge are substantially altered.

The Old Pacific Electric Santa Ana River Bridge would remain in place and a single-track bridge would be constructed immediately to the south. Through the use of gates and signaling, the single-track bridge would accommodate bi-directional fixed guideway traffic. It would require alteration in the western end of the bridge to connect beyond the Santa Ana River Trail which would result in a direct use. The minor alteration to the western bridge abutment would not substantially impair the features or attributes of the resource which qualify it as a National Register-eligible resource.

The feature that qualifies the bridge as a resource, the Pegram Truss, is defined by its features of a distinguishable geometric design, with the posts arranged at increasing angles from the vertical chords from the center of the Truss towards the ends. These features are most distinguishable at the top of the bridge span. Because the views of the existing bridge would only be partially obstructed at the base of the bridge and to a limited group of viewers, the adjacent single-track bridge would not substantially impair the bridge's activities, or view of the Pegram Truss architecture. The finding of a *de minimis* use requires a finding of no adverse effect on historic properties. The FTA, in consultation with SHPO, determined that Streetcar Alternatives 1 and 2 would not have an adverse effect on the Old Pacific Electric Santa Ana River Bridge. 36 CFR Part 800.4(d)(i) states that if the SHPO does not object within 30 days of receipt of the finding of no adverse effect, the agency official's responsibilities under Section 106 are complete. A letter to SHPO indicating the finding of no adverse effect to the Old Pacific Electric Santa Ana River Bridge has been included in the Cultural Resources Evaluation Report included as Appendix F. Coordination between FTA, OCTA, and the City of Santa Ana during the SHPO review process culminated in a letter of concurrence of no adverse effect dated April 7, 2014 (Appendix F). Therefore, Streetcar

Alternatives 1 and 2 would result in a *de minimis* use of the historic bridge. Refer to Section 3.7 for additional details on effects to cultural and historic resources.

Temporary closures may occur to the Santa Ana River Trail and Bikeway, which runs perpendicular below the bridge during construction. This would result in a temporary occupancy of the Santa Ana River Trail and Bikeway as specified under the five conditions in 23 CFR 774.13(d). The scope of work would be minor and the duration of the temporary closure would be minimal. No change in ownership would occur and a detour route would be provided so that access and use of the trail and bikeway would not be affected. No adverse physical effects would occur to the trail and bikeway and construction would not interfere with the activities along the trail and bikeway. After construction, the trail would be fully restored to the same condition prior to construction. The Orange County Parks Department, who has jurisdiction over this portion of the resource, has provided written concurrence that the use of the Santa Ana River Trail and Bikeway would be a temporary occupancy. Therefore, the temporary occupancy of this resource through the temporary closure would be so minimal as to not constitute a use within the meaning of Section 4(f).

3.4.2.4 IOS-1 and IOS-2

IOS-1 and IOS-2 would terminate at Raitt Street and Santa Ana Boulevard. Effects from the implementation of IOS-1 and IOS-2 are similar to those identified for Streetcar Alternatives 1 and 2, with the exception of effects to the Old Pacific Electric Santa Ana River Bridge. The IOS-1 and IOS-2 alignments would not encompass the Old Pacific Electric Santa Ana River Bridge and no direct or constructive use of the existing bridge would occur. Therefore, IOS-1 and IOS-2 would not result in a use of Section 4(f) resources.

3.4.3 Measures to Minimize Harm

Operational effects related to Section 4(f) resources would result in a use of the Old Pacific Electric Santa Ana River Bridge, a Section 4(f) resource, related to the connecting the western end of the bridge to the Santa Ana River Trail. During final design, a qualified structural engineer would survey the existing foundation and other structural aspects of the Pacific Electric Santa Ana Railroad Bridge and provide measures to protect the historic bridge from potential damage. Construction of the new single track bridge and alteration to the existing bridge would result a temporary occupancy of the Santa Ana River Trail, a Section 4(f) resource. However, a detour route would be provided so that access and use of the trail would not be affected. Coordination with the agencies with jurisdiction over these resources, the SHPO and County of Orange Parks Department would ensure that no adverse effects occur during the use of the Old Pacific Electric Santa Ana River Bridge and temporary occupancy of the Santa Ana River Trail. No additional measures to minimize harm are necessary.

3.5 Community Effects and Environmental Justice

This section provides an overview of community character and environmental justice and was prepared utilizing the Community Impact Assessment Technical Report included as

Appendix C. The analysis is based on the affected environment and project features, and evaluates impacts associated with the proposed project.

3.5.1 Affected Environment

All projects involving federal funding, permitting, or federal land must comply with Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. Executive Order 12898 directs federal agencies to identify and address disproportionately high and adverse effects of federal projects on the health or environment of minority and low-income populations to the greatest extent practicable and permitted by law. The environmental justice principles are derived from Title VI of the Civil Rights Act of 1964, which prohibits discrimination on the basis of race, color, and national origin in programs and activities receiving federal financial assistance. Additional laws, statutes, guidelines, and regulation that relate to environmental justice issues include the U.S. Department of Transportation Order 5610.2(a) Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (May 2012), and FTA Circular 4703.1 Environmental Justice Policy Guidance for FTA Recipients (August 2012).

Additionally, under Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, federal agencies must examine and identify the need for services to limited English proficiency (LEP) populations and develop and implement a system to provide services, if needed. Federal financial assistance programs or activities must also not discriminate based on age, as delineated by the Age Discrimination Act of 1975.

3.5.1.1 Study Area

Fourteen neighborhoods were identified within the Study Area, and evaluated for community character and environmental justice (EJ). Eleven of these neighborhoods are defined by the City of Santa Ana. The remaining three neighborhoods are defined as Garden Grove Southeast, Santa Ana River East, and SARTC East based on census blocks within the Study Area. Data from the 2010 Census Bureau and 2010 American Community Survey (ACS) were used to characterize the socioeconomic demographics for the 14 neighborhoods. The neighborhoods consisted of 428 census blocks and 12 census tracts. **Figure 3.5-1** illustrates the neighborhoods, census blocks, and census tracts boundaries within the Study Area.

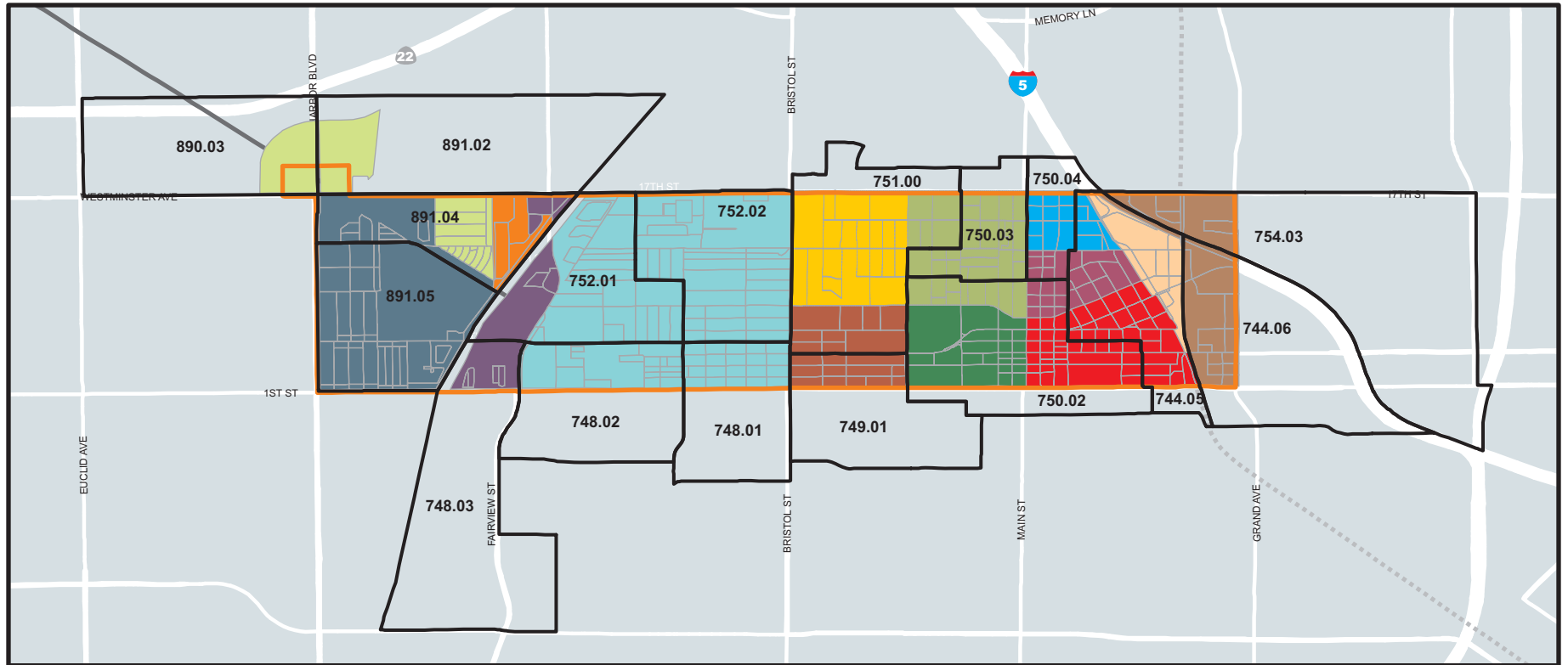
Population

In 2010, the Study Area's population was 61,649, which included 58,286 persons in the City of Santa Ana and 3,363 persons in the City of Garden Grove (Census 2010). This represented approximately 18 percent of the City of Santa Ana's total population and 2 percent of the City of Garden Grove's total population. The population density in the Study Area is approximately 15,238 persons per square mile. **Figure 3.5-2** illustrates the 2010 housing and population densities in the Study Area. The Study Area contains a racially and ethnically diverse population, with 92.2 percent of the population identified as a racial or ethnic minority. The Study Area population is 36.2 percent over the age of five with LEP, 5.4 percent elderly (age 65 and older), 33.3 percent children, 16.9 percent disabled, and 1.5 percent veterans.

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Neighborhood and Census Boundaries



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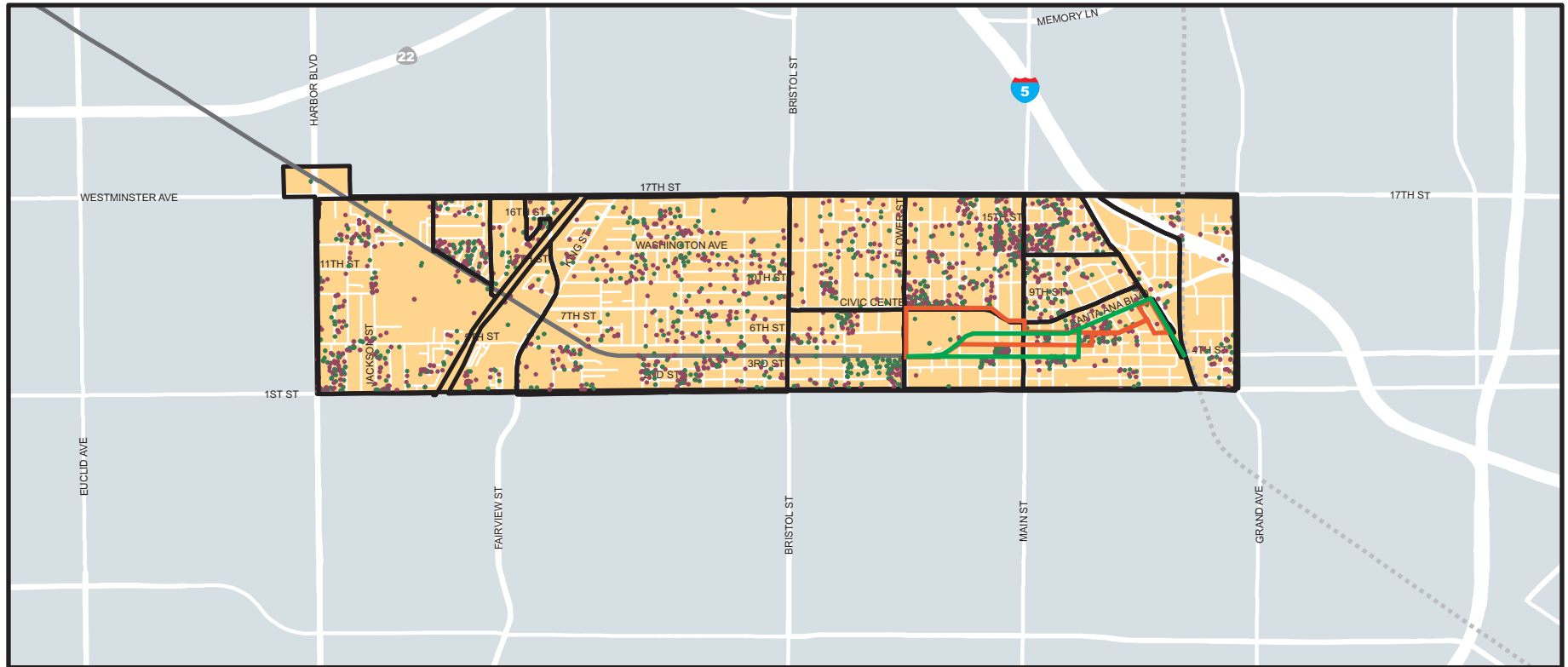
Study Area	Census Tracts	Artesia Pilar	French Court	Lacy	SARTC East	Washington Square
PE ROW	Census Blocks	Downtown	French Park	Logan	Santa Anita	Willard
Metrolink/Amtrak Rail Line		Flower Park	Garden Grove Southeast	Mar-Les	Santa Ana River East	

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Population and Housing Density



LEGEND:

- Study Area
- Neighborhood Boundary
- Streetcar Alternatives 1 & 2
- Streetcar Alternative 1 - East of Flower
- Streetcar Alternative 2 - East of Flower
- Housing
- Population
- 1 Dot = 50 Units

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Housing

In 2010, the Study Area contained approximately 13,780 housing units, which represented 11.1 percent of the combined City of Santa Ana's and Garden Grove's housing stock (Census 2010). Housing data indicate that 30.7 percent of the population own their home and 61.6 percent of the population have lived in the same residence for seven or more years. The median income of the Study Area is \$45,191 and 42.4 percent of persons living in the Study Area are transit dependent-households with one or fewer vehicles (American Community Survey 2010).

Employment

In 2008, the Study Area's employment was 38,632 which included 37,643 jobs in the City of Santa Ana and 989 jobs in the City of Garden Grove (American Community Survey 2010). This represented 25.7 percent of the City of Santa Ana's total employment and 1.2 percent of the City of Garden Grove's total employment.

3.5.1.2 Study Area Communities

A neighborhood can be described as an area in which the land use is residential, although there may be a considerable number of primarily non-residential areas such as commercial corridors. The proposed alignment would be within one-half mile of the 14 neighborhoods: Artesia Pilar, Downtown Santa Ana, Flower Park, French Court, French Park, Garden Grove Southeast, Lacy, Logan, Mar-Les, Santa Ana River East, Santa Anita, SARTC East, Washington Square, and Willard. Each neighborhood includes its own set of local attractions or activity centers, referred to as "community assets" in the individual neighborhood analyses. The community assets discussed in this analysis are located adjacent or within one half-mile of the proposed alignments. The neighborhoods are discussed in terms of community, demographic, and socioeconomic character. Where data were not available at the Census Block level, Census Tracts were used to obtain data. Census tracts were incorporated as part of a neighborhood if 30 percent or more of the area were within the Study Area. **Table 3.5-1** shows a summary of demographics for the communities within the Study Area.

SARTC East. The SARTC East Neighborhood is bounded by 17th Street on the north, 1st Street on the south, Lincoln Avenue and the I-5 on the west, and Grand Avenue on the east. It includes a mix of residential, commercial, and industrial land uses. There are no schools, parks, or other community assets within the SARTC East portion of the Study Area.

The SARTC East Neighborhood is comprised of 407 housing units and a median household income of approximately \$57,254. The total population is approximately 1,871, and the population density is 6,737 persons per square mile. The majority of the population (64.9 percent) belongs to the age group between 18 and 64. The age group 18 and younger comprises 31.4 percent and the group 65 years of age and over comprises 3.7 percent. The percentage of persons who own their homes and have lived there for more than seven years is 59.4. Disabled, veterans, and LEP constitute 23.7, 0.9, and 31.3 percent of the

TABLE 3.5-1: NEIGHBORHOOD DEMOGRAPHIC CHARACTERISTICS

Neighborhoods	Housing (Units)	Median Household Income (\$)	Population (Persons)	Percent							
				Under 18 Years Old	Between 18-64 Years Old	65 & Over Years Old	Home Owners More Than Seven Years	Disabled	Veterans	Limited English Proficiency/a/	Transit Dependent/b/
SARTC East	407	57,254	1,871	31.4	64.9	3.7	59.4	23.7	0.9	51.2	45.0
Logan	122	42,637	468	32.3	63.0	4.7	44.9	19.2	1.0	63.1	41.3
French Court	1,116	45,819	4,691	40.0	58.2	1.8	47.2	25.4	0.6	68.1	54.5
French Park	652	36,161	2,176	30.9	62.7	6.4	56.3	27.7	1.0	70.7	63.4
Lacy	1,159	42,637	4,823	35.3	62.1	2.6	44.9	19.2	1.0	63.1	41.3
Willard	2,409	37,843	9,871	39.9	56.1	4.0	42.6	18.4	0.8	65.2	61.6
Downtown Santa Ana	755	36,161	2,184	23.6	64.2	12	56.3	27.7	1.0	70.7	63.4
Washington Square	757	41,277	2,870	28.7	64.3	7.0	62.8	26.2	2.6	49.7	43.4
Flower Park	968	41,277	6,261	21.7	72.7	5.6	62.8	26.2	2.6	49.7	43.4
Artesia Pilar	2,550	61,752	13,260	32.4	60.8	6.8	75.1	25.3	1.8	59.5	24.9
Santa Ana River East	291	61,752	1,150	29.5	59.6	11	75.1	25.3	1.8	59.5	24.9
Mar-Les	239	38,981	1,146	32.5	61.8	5.7	62.4	24.2	2.5	42.8	47.3
Santa Anita	1,433	50,142	7,515	36.4	59.3	4.3	55.7	23.0	0.2	63.9	41.8
Garden Grove Southeast	922	38,981	3,363	34.9	57.4	7.7	62.4	24.2	2.5	42.8	47.3

/a/ LEP percentages are based on total population who speak English less than “very well” over total population over 5 years of age.

/b/ Transit dependent percentages are based on total of persons who own 1 or no vehicles over total population.

Source: U.S. Census Bureau, 2010, and 2006-2010 American Community Survey.

population, respectively. Transit dependent patrons within the SARTC East Neighborhood comprise 45.0 percent of the population.

Logan. The Logan Neighborhood is bounded by I-5 on the north, Penn Way and Santiago Street on the west, Lincoln Avenue on the east, and Santa Ana Boulevard on the south. It includes industrial, residential, and institutional land uses. The only community asset within Logan that falls within the Study Area is Logan Recreational Center, at 1009 Custer Street.

The Logan Neighborhood is comprised of 122 housing units and a median household income of approximately \$42,637. The total population is approximately 468, and the population density is 4,162 persons per square mile. The majority of the population (63.0 percent) belongs to the age group between 18 and 64. The age group 18 and younger comprises 32.3 percent and the group 65 years of age and over comprises 4.7 percent. The percentage of persons who own their homes and have lived there for more than seven years is 44.9. Disabled, veterans, and LEP constitute 19.2, 1.0, and 63.1 percent of the population, respectively. Transit dependent patrons within the Logan Neighborhood comprise 41.3 percent of the population.

French Court. The French Court Neighborhood is bounded by 17th Street on the south, 20th Street on the north, Penn Way on the east, and Main Street on the west. It includes a mix of residential and commercial land uses, with few industrial uses. There are no schools, parks, or other community assets within the French Court portion of the Study Area.

The French Court Neighborhood is comprised of 1,116 housing units and a median household income of approximately \$45,819. The total population is approximately 4,691, and the population density is 48,536 persons per square mile. The majority of the population (58.2 percent) belongs to the age group between 18 and 64. The age group 18 and younger comprises 40.0 percent and the group 65 years of age and over comprises 1.8 percent. The percentage of persons who own their homes and have lived there for more than seven years is 47.2. Disabled, veterans, and LEP constitute 25.4, 0.6, and 45.0 percent of the population, respectively. Transit dependent patrons within the French Court Neighborhood comprise 54.5 percent of the population.

French Park. The French Park neighborhood, also known as the French Park Historic District, is a 20-square-block historical neighborhood, bounded by Washington Avenue on the north, Civic Center Drive on the south, Poinsettia Street on the east, and Bush Street on the west. It includes a mix of residential, commercial and industrial land uses. The neighborhood includes homes built between the late 1890s and 1920s, ranging in various architectural styles, including Craftsman, Colonial Revival, Victorian and Neo-Classical, Craftsman Bungalow, Spanish Colonial, and Spanish Eclectic Revival. The historic Dr. Howe-Waffle House is located in French Park. Historic French Park was officially listed on the National Register of Historic Places in 1999. The only community asset within the Historic French Park portion of the Study Areas French Park located at 901 French Street.

The French Park Neighborhood is comprised of 652 housing units and a median household income of approximately \$36,161. The total population is approximately 2,176, and the population density is 17,086 persons per square mile. The majority of the population (62.7 percent) belongs to the age group between 18 and 64. The age group 18 and younger comprises 30.9 percent and the group 65 years of age and over comprises 6.4 percent. The percentage of persons who own their homes and have lived there for more than seven years is 56.3. Disabled, veterans, and LEP constitute 27.7, 1.0, and 41.0 percent of the population, respectively. Transit dependent patrons within the French Park Neighborhood comprise 63.4 percent of the population.

Lacy. The Lacy Neighborhood is bounded by Civic Center Drive on the north, 1st Street on the south, Santiago Avenue on the east, and Main Street on the west. It includes a mix of residential, industrial, commercial, and institutional land uses. Community assets within the Lacy portion of the Study Area include the following:

- St. Joseph Church located at 727 Minter Street
- Garfield Elementary School located at 1601 East Chestnut Avenue

The Lacy Neighborhood is comprised of 1,159 housing units and a median household income of approximately \$42,637. The total population is approximately 4,823, and the population density is 16,891 persons per square mile. The majority of the population (62.1 percent) belongs to the age group between 18 and 64. The age group 18 and younger comprises 35.3 percent and the group 65 years of age and over comprises 2.6 percent. The percentage of persons who own their homes and have lived there for more than seven years is 44.9. Disabled, veterans, and LEP constitute 19.2, 1.0, and 38.1 percent of the population, respectively. Transit dependent patrons within the Lacy Neighborhood comprise 41.3 percent of the population.

Willard. The Willard Neighborhood is bounded by 17th Street on the north, Civic Center Drive on the south, Broadway Street on the east, and Flower Street on the west. It includes a mix residential and commercial land uses. Community assets within the Willard portion of the Study Area include the following:

- Willard Intermediate School located at 1342 Ross Street
- Story Book Preschool located at 1032 Ross Street

The Willard Neighborhood is comprised of 2,409 housing units and a median household income of approximately \$37,843. The total population is approximately 9,871, and the population density is 32,379 persons per square mile. The majority of the population (56.1 percent) belongs to the age group between 18 and 64. The age group 18 and younger comprises 39.9 percent and the group 65 years of age and over comprises 4.0 percent. The percentage of persons who own their homes and have lived there for more than seven years is 42.6. Disabled, veterans, and LEP constitute 18.4, 0.8, and 42.9 percent of the population, respectively. Transit dependent patrons within the Willard Neighborhood comprise 61.6 percent of the population.

Downtown Santa Ana. The Downtown Santa Ana Neighborhood is bounded by Civic Center Drive on the north, 1st Street on the south, Main Street on the east, and Flower Street on the west. It includes commercial land uses, with some residential, institutional and parkland uses. Community assets within the Downtown Santa Ana portion of the Study Area include the following:

- Sasscer Park located at 502 Santa Ana Boulevard
- Birch Park located at 210 Birch Street

The Downtown Santa Ana Neighborhood is comprised of 755 housing units and a median household income of approximately \$36,161. The total population is approximately 2,184, and the population density is 10,663 persons per square mile. The majority of the population (64.2 percent) belongs to the age group between 18 and 64. The age group 18 and younger comprises 23.6 percent and the group 65 years of age and over comprises 12.2 percent. The percentage of persons who own their homes and have lived there for more than seven years is 56.3. Disabled, veterans, and LEP constitute 27.7, 1.0, and 41.0 percent of the population, respectively. Transit dependent patrons within the Downtown Santa Ana Neighborhood comprise 63.4 percent of the population.

Washington Square. The Washington Square Neighborhood is bounded by 17th Street on the north, Civic Center Drive on the south, Bristol Street on the west, and Flower Street on the east. It includes residential land uses, with a few commercial uses. Community assets within the Washington Square portion of the Study Area include the following:

- Wilson Elementary School located at 1317 Baker Street
- Heroes Elementary School located at 1111 Civic Center Drive

The Washington Square Neighborhood is comprised of 757 housing units and a median household income of approximately \$41,277. The total population is approximately 2,870, and the population density is 9,883 persons per square mile. The majority of the population (64.3 percent) belongs to the age group between 18 and 64. The age group 18 and younger comprises 28.7 percent and the group 65 years of age and over comprises 7.0 percent. The percentage of persons who own their homes and have lived there for more than seven years is 62.8. Disabled, veterans, and LEP constitute 26.2, 2.6, and 27.8 percent of the population, respectively. Transit dependent patrons within the Washington Square Neighborhood comprise 43.4 percent of the population.

Flower Park. The Flower Park Neighborhood is bounded by Civic Center Drive on the north, 1st Street on the south, Flower Street on the east, and Bristol Street on the west. It includes a mix of residential, commercial and parkland land uses. Community assets within the Flower Park portion of the Study Area include the following:

- Angels Community Park located at 914 3rd Street
- Santa Ana Stadium located on the corner of Civic Center Drive and North Flower Street

The Flower Park Neighborhood is comprised of 968 housing units and a median household income of approximately \$41,277. The total population is approximately 6,261, and the

population density is 30,457 persons per square mile. The majority of the population (72.7 percent) belongs to the age group between 18 and 64. The age group 18 and younger comprises 21.7 percent and the group 65 years of age and over comprises 5.6 percent. The percentage of persons who own their homes and have lived there for more than seven years is 62.8. Disabled, veterans, and LEP constitute 26.2, 2.6, and 2.8 percent of the population, respectively. Transit dependent patrons within the Flower Park Neighborhood comprise 43.4 percent of the population.

Artesia Pilar. The Artesia Pilar Neighborhood is bounded by 17th Street on the north, 1st Street on the south, Fairview Street on the west, and Bristol Street on the east. It includes a mix of residential, commercial, industrial and parkland uses. The most prominent landmarks in Artesia Pilar are El Salvador Park, at 1825 Civic Center Drive, and Santa Ana College, at 1530 17th Street. Additional community assets within the Artesia Pilar portion of the Study Area include the following:

- Spurgeon Intermediate School located at 2701 5th Street
- Nova Academy Secondary Charter School located at 609 5th Street
- Cruz Romero Elementary School located at 1512 Santa Ana Boulevard
- George Washington Carver Elementary School located at 1401 Santa Ana Boulevard
- Santa Ana College located at 1530 17th Street
- Freemont Elementary School located at 1930 10th Street
- Our Lady of the Pillar School located at 1622 6th Street

The Artesia Pilar Neighborhood is comprised of 2,550 housing units and a median household income of approximately \$61,752. The total population is approximately 13,260, and the population density is 12,610 persons per square mile. The majority of the population (60.8 percent) belongs to the age group between 18 and 64. The age group 18 and younger comprises 32.4 percent and the group 65 years of age and over comprises 6.8 percent. The percentage of persons who own their homes and have lived there for more than seven years is 75.1. Disabled, veterans, and LEP constitute 25.3, 1.8, and 34.8 percent of the population, respectively. Transit dependent patrons within the Artesia Pilar Neighborhood comprise 24.9 percent of the population.

Santa Ana River East. The Santa Ana River East Neighborhood is bounded by 17th Street on the north, 1st Street on the south, Fairview Street on the east, and the Santa Ana River and Huron Drive on the west. It includes a mix of residential, commercial, and industrial land uses. Community assets within the Santa Ana River East portion of the Study Area include the following:

- PE ROW Trail
- Santa Ana River Trail
- Spurgeon Intermediate School/Joint Use Recreational Area at 2701 5th Street

The Santa Ana River East Neighborhood is comprised of 291 housing units and a median household income of approximately \$61,751. The total population is approximately 1,150,

and the population density is 6,742 persons per square mile. The majority of the population (59.6 percent) belongs to the age group between 18 and 64. The age group 18 and younger comprises 29.5 percent and the group 65 years of age and over comprises 10.9 percent. The percentage of persons who own their homes and have lived there for more than seven years is 75.1. Disabled, veterans, and LEP constitute 25.3, 1.8, and 34.8 percent of the population, respectively. Transit dependent patrons within the Santa Ana River East Neighborhood comprise 24.9 percent of the population.

Mar-Les. The Mar-Les Neighborhood is bounded by Westminster Avenue on the north, the Santa Ana River on the south, Huron Drive on the east, and Buena Street on the west. It includes residential land uses, with a few commercial uses. There are no schools, parks, or other community assets within the Mar-Les portion of the Study Area.

The Mar-Les Neighborhood is comprised of 239 housing units and a median household income of approximately \$38,981. The total population is approximately 1,146, and the population density is 15,760 persons per square mile. The majority of the population (61.8 percent) belongs to the age group between 18 and 64. The age group 18 and younger comprises 32.5 percent and the group 65 years of age and over comprises 5.7 percent. The percentage of persons who own their homes and have lived there for more than seven years is 62.4. Disabled, veterans, and LEP constitute 24.2, 2.5, and 28.8 percent of the population, respectively. Transit dependent patrons within the Mar-Les Neighborhood comprise 47.3 percent of the population.

Santa Anita. The Santa Anita Neighborhood is bounded by Westminster Avenue on the north, McFadden Street on the south, the Santa Ana River on the east, and Harbor Boulevard on the west. It includes a mix of residential, commercial, and parkland land uses. Community assets within the Santa Anita portion of the Study Area include the following:

- Doctor Edward Russell Elementary School located at 600 Jackson Street
- Campesino Park located at 3311 5th Street
- Santa Anita Park located at 2302 Raitt Street

The Santa Anita Neighborhood is comprised of 1,433 housing units and a median household income of approximately \$50,142. The total population is approximately 7,515, and the population density is 12,546 persons per square mile. The majority of the population (59.3 percent) belongs to the age group between 18 and 64. The age group 18 and younger comprises 36.4 percent and the group 65 years of age and over comprises 4.3 percent. The percentage of persons who own their homes and have lived there for more than seven years is 55.7. Disabled, veterans, and LEP constitute 23.0, 0.2, and 63.9 percent of the population, respectively. Transit dependent patrons within the Santa Anita Neighborhood comprise 41.8 percent of the population.

Garden Grove Southeast. The Garden Grove Southeast Neighborhood consists of two areas, the area west of Mar-Les and the area northwest of Santa Anita. The first area is bounded by Westminster Avenue on the north, Redwood on the south, Clinton Street on the west, and Mar Les on the east. The second area is bounded by Nautilus Drive on the east, Quatro

Avenue on the North, Seaboard Circle on the west, and Westminster Avenue on the south. It includes a mix of residential, industrial, and commercial land uses. There are no schools, parks, or other community assets within the Garden Grove Southeast portion of the Study Area.

The Garden Grove Southeast Neighborhood is comprised of 922 housing units and a median household income of approximately \$38,981. The total population is approximately 3,363, and the population density is 13,647 persons per square mile. The majority of the population (57.4 percent) belongs to the age group between 18 and 64. The age group 18 and younger comprises 34.9 percent and the group 65 years of age and over comprises 7.7 percent. The percentage of persons who own their homes and have lived there for more than seven years is 62.4. Disabled, veterans, and LEP constitute 24.2, 2.5, and 28.8 percent of the population, respectively. Transit dependent patrons within the Garden Grove Southeast Neighborhood comprise 47.3 percent of the population.

3.5.1.3 Study Area Environmental Justice Population

EJ populations are communities that have a higher proportion of minority and/or low income populations in comparison to the surrounding community. The evaluation of potential EJ impacts requires a comparison with a larger unit of geographical comparison. For the analysis of EJ impacts, three geographical areas were considered: the City of Santa Ana, the Study Area, and the communities and neighborhoods within the Study Area. The City of Santa Ana was selected as the larger unit of geographical comparison because it is the most representative urban environment and contains approximately 97 percent of the Study Area. The Study Area for the assessment of impacts is the area within one-half mile of the proposed alignment.

Minority and low-income populations from the communities within the Study Area were compared to the demographics for the City of Santa Ana.

Minority Populations. Guidance from the Council on Environmental Quality on EJ defines the term “minority” to include any individual who is American Indian and Alaska Native, Asian, African American, Latino, and Native Hawaiian and Other Pacific Islander. More specifically, these minority groups are defined as follows:

- *American Indian and Alaska Native*, which refers to persons having origins in any of the original populations of North and South America (including Central America), and who maintain tribal affiliation or community attachment
- *Asian*, which refers to persons having origins in any of the original populations of the Far East, Southeast Asia, or the Indian subcontinent including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam
- *African American*, which refers to persons having origins in any of the Black racial groups of Africa

- *Latino*, which includes persons of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race
- *Native Hawaiian and Other Pacific Islander*, which refers to persons having origins in any of the original populations of Hawaii, Guam, Samoa, or other Pacific Islands

Low-Income Populations. The U.S. Department of Transportation Order 5610.2 and subsequent agency guidance define the term “low income” as a person with a household income at or below the U.S. Department of Health and Human Services poverty guidelines. These poverty guidelines are a simplified version of the federal poverty thresholds used for administrative purposes. The U.S. Census Bureau has developed poverty thresholds, which are used for calculating all official poverty population statistics to provide the basis for determining low-income and poverty characteristics in this EJ analysis. In addition, low-income population is defined as any readily identifiable group of low income persons who live in geographic proximity and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who would be similarly affected by a proposed Department of Transportation program, policy, or activity.

The Council on Environmental Quality has established guidelines for identifying disproportionately high and adverse impacts to EJ populations. According to this guidance, individual minority populations should be identified when the minority population percentage of the affected area is greater than 50 percent or is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis. The guidance identifies the need for a separate individual minority analysis of neighborhoods and communities where the percentage is meaningfully greater.

Table 3.5-2 summarizes the EJ data for the communities within the Study Area. All bolded percentages indicate the percent is meaningfully greater, as established by the threshold, compared to the City of Santa Ana. All 14 communities within the Study Area have total minority populations above 50 percent, which qualify them all as EJ Communities. Five neighborhoods have Asian populations, four neighborhoods have Hispanic and other populations, and three neighborhoods have African-American populations that are meaningfully greater than the City of Santa Ana. Ten of the 14 neighborhoods are also considered EJ communities because of their meaningfully greater percentage of below-poverty populations compared to the City of Santa Ana. **Figures 3.5-3** and **3.5-4** illustrates minority and poverty composition for the Study Area, respectively.

TABLE 3.5-2: 2010 DEMOGRAPHIC AND SOCIOECONOMIC DATA

Geographic Area	EJ Community	Percent					
		Aggregate Minority	Population Below Poverty Level	Hispanic	African American	Asian	Other/a/
City of Santa Ana	Yes	88.0	17.9	73.7	1.2	12.1	1.0
City of Garden Grove	Yes	77.7	14.3	36.3	1.1	37.6	2.7
Threshold/b/	--	50.0	21.5	88.4	1.4	14.5	1.2
Study Area		92.1	23.9	82.5	1.3	7.5	0.8
SARTC East	Yes	90.3	17.6	83.9	1.8	3.7	0.9
Logan	Yes	84.5	22.5	79.8	0.6	2.5	1.6
French Court	Yes	95.8	34.8	93.7	0.7	1.1	0.3
French Park	Yes	82.1	32.9	69.7	3.9	7.4	1.1
Lacy	Yes	93.9	22.5	90.7	0.7	2.0	0.5
Willard	Yes	96.9	31.9	92.0	0.5	3.6	0.8
Downtown Santa Ana	Yes	84.5	22.8	66.6	3.1	13.8	1.0
Washington Square	Yes	77.0	32.9	70.2	1.0	4.3	1.5
Geographic Area	EJ Community	Percent					
		Aggregate Minority	Population Below Poverty Level	Hispanic	African American	Asian	Other/a/
Flower Park	Yes	82.1	32.9	69.7	3.9	7.4	1.1
Artesia Pilar	Yes	96.4	16.2	90.9	1.4	3.4	0.7
Santa Ana River East	Yes	96.5	16.2	69.4	0.7	26.0	0.4
Mar-Les	Yes	93.6	25.0	67.7	0.0	25.4	0.5
Santa Anita	Yes	96.9	26.9	81.4	0.2	14.8	0.5
Garden Grove Southeast	Yes	94.9	25.0	66.5	0.7	26.1	1.6

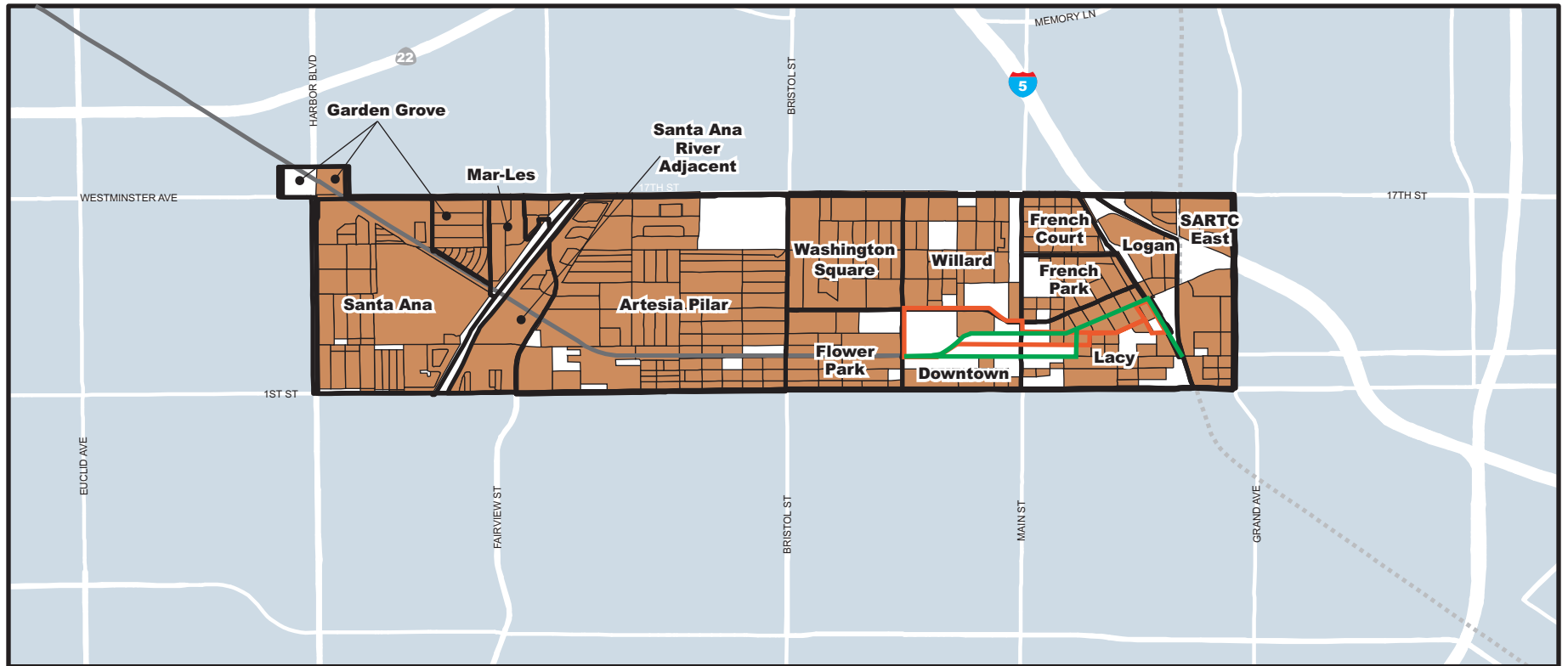
/a/ "Other" consist of American Indian and Alaska Native alone, Native Hawaiian and Other Pacific Islander alone, Some Other Race alone, and Two or More Races (as defined by the U.S Census Bureau).

/b/ The aggregate minority threshold is based on guidelines established by the Council on Environmental Quality. All other threshold figures are based on 20 percent above the City of Santa Ana.

Source: U.S. Census Bureau, 2010, and 2006-2010 American Community Survey



Minority Composition by Census Block



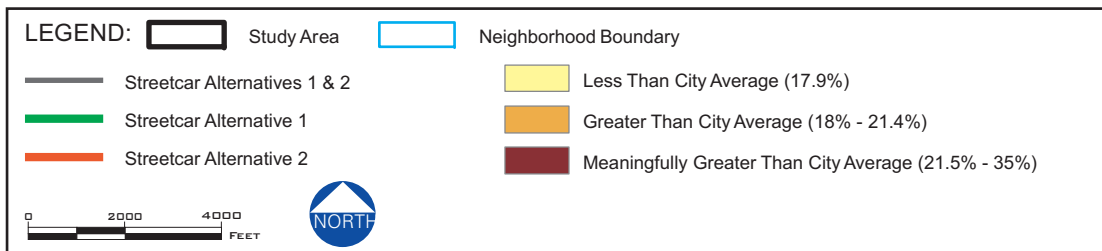
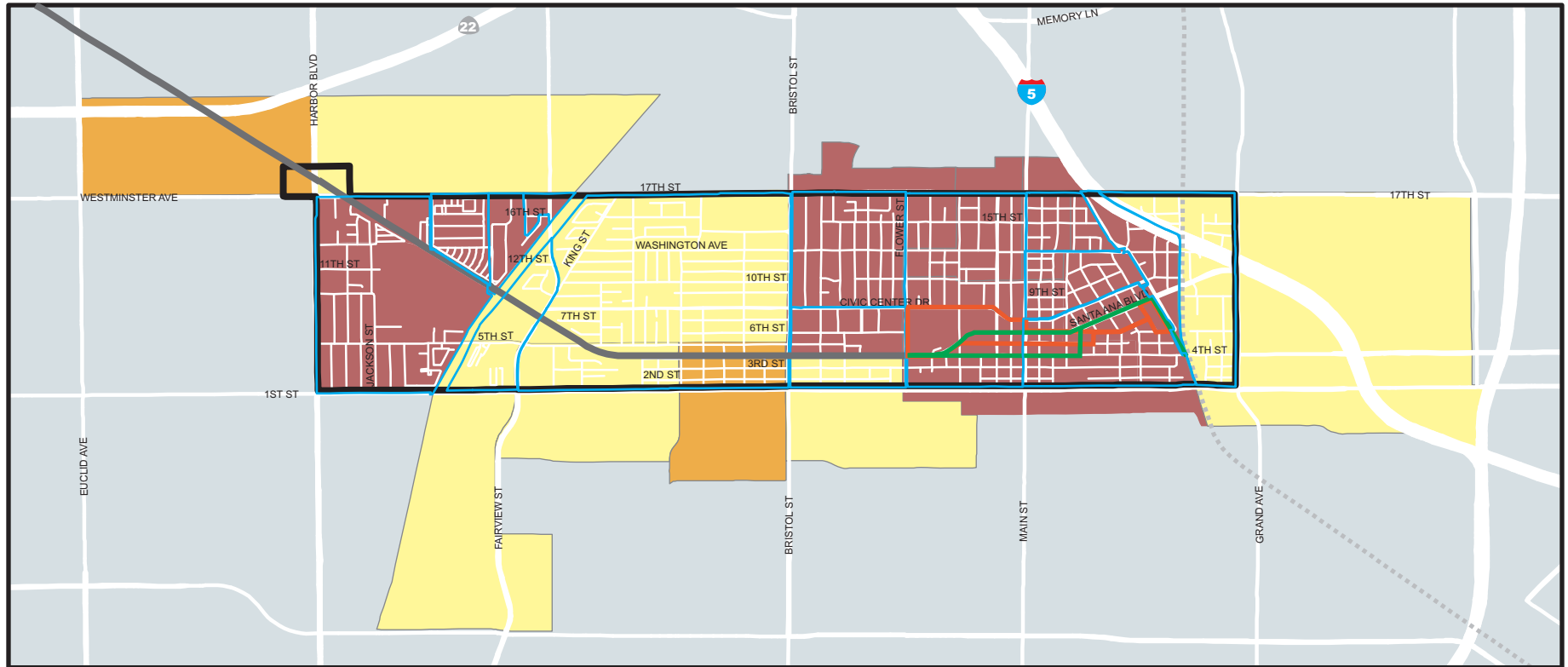
LEGEND:

Study Area	Neighborhood Boundary	Census Block
Streetcar Alternatives 1 & 2	Unpopulated	
Streetcar Alternative 1 - East of Flower	Less Than 50%	
Streetcar Alternative 2 - East of Flower	Greater Than 50%	

0 2000 4000 FEET

Source: 2010 US Census, ESRI 2012, and Terry A. Hayes Associates Inc. August 2012.

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3.5.2 Environmental Consequences

As described above, all of the neighborhoods within the Study Area are considered EJ populations; the impacts to communities would characterize the impacts to EJ populations. Therefore, the discussion of community impacts and EJ has been combined for purposes of this analysis.

3.5.2.1 No Build Alternative

The No Build Alternative takes existing conditions within the Study Area and adds future planned and funded transit and roadway improvement projects. Each of these future projects will be environmentally cleared through separate project-specific environmental documentation. The No Build Alternative would not involve construction of transit infrastructure that would physically divide an established community or adversely affect neighborhoods and community cohesion. As such, no adverse effects to community character and cohesion would occur. However, this alternative would not enhance transit linkages between the City of Santa Ana and the City of Garden Grove, or improve accessibility within the Study Area communities.

Under the No Build Alternative, the communities within the Study Area would be expected to continue to change and grow over time, but changes would not occur as a result of the proposed project. Transit service would be similar to existing conditions, and no substantial transit infrastructure investment is anticipated in the Study Area. Given the high percentage of minority and low-income populations in the Study Area, and the high number of households with no vehicles, the No Build Alternative would not provide mobility improvements to these communities when compared to the other alternatives. However, the No Build Alternative would not result in adverse effects related to the character (composition and stability of the neighborhood) of the communities within the Study Area. In addition, because there would not be adverse effects to these communities, effects to EJ populations within these communities would not be disproportionately high and adverse.

3.5.2.2 TSM Alternative

The TSM Alternative emphasizes low-cost improvements and operational efficiencies, such as focused traffic engineering actions, expanded bus service, and improved access to transit services. It may include some minor physical enhancements, such as improvements to transit stop amenities (e.g., bus benches). These improvements would require minimal construction and would not displace properties or cause substantial visual or noise effects during operations. Furthermore, these minimal changes would not be enough to have an adverse effect on the neighborhoods and communities and the EJ populations that reside in these communities within the Study Area. The improvements made under the TSM Alternative would not divide an existing residential neighborhood or community as the new bus service would operate on streets and all improvements would be located in existing right-of-way. The TSM Alternative would not permanently limit existing connectivity within the Study Area. Therefore, the TSM Alternative would not result in adverse effects related to the character of the communities within the Study Area. In addition, because there would not be adverse

effects to these communities, effects to EJ populations within these communities would not be disproportionately high and adverse.

3.5.2.3 Streetcar Alternatives 1 and 2

The following discussion describes the environmental effects of the Streetcar Alternatives to communities within the Study Area and to the EJ populations that reside in those neighborhoods. Similar adverse effects would occur during construction to traffic, air quality and noise that would occur in all neighborhoods adjacent to the alignment and are not discussed individually within each neighborhood. These effects would be dispersed and occur to all of the communities along the alignment and the EJ populations within them. Therefore, the effects would not be concentrated to minority and low-income populations and would not be disproportionately high and adverse to EJ populations. Mitigation measures to reduce these temporary effects are identified in Section 3.16 (Construction).

Logan Neighborhood. Streetcar Alternatives 1 and 2 would enter the Logan Neighborhood at Santiago Street. Within the Logan Neighborhood, land uses immediately adjacent to the proposed alignments include transportation and industrial uses. One full parcel acquisition containing an industrial use would be required for the O & M Facility Site A. The extent of this limited acquisition would not alter the character or cohesion of the existing neighborhood. Sections 3.1 through 3.4 and 3.6 through 3.16 determined that no adverse health and environmental effects from land use, displacement and economic effects, recreational resources, visual quality, cultural resources, geotechnical and hazardous materials, hydrology, traffic and parking, noise and vibration, air quality and greenhouse gases, and safety and security. Because no adverse health and environmental effects would occur to these residences, which contain EJ populations, Streetcar Alternatives 1 and 2 would not divide the community or disrupt community character and cohesion. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects to the Logan Neighborhood. Because no adverse effects would occur to this community, the effects to EJ populations within this community would not be disproportionately high and adverse.

Lacy Neighborhood. Streetcar Alternatives 1 and 2 would enter the Lacy Neighborhood at Main Street. Land uses adjacent to the Streetcar Alternative 1 alignment include commercial and public facilities. Land uses adjacent to the Streetcar Alternative 2 alignment include medium- to high-density residential, industrial, and public facilities uses. Streetcar Alternative 1 would require one partial parcel acquisition and Streetcar Alternative 2 would require two partial parcel acquisitions which contain industrial and parking uses. The extent of this limited acquisition that would occur in EJ populations would not alter the character or cohesion of the existing neighborhood. Construction of Streetcar Alternatives 1 and 2 would result in vibration effects to two residential receptors in close proximity to the alignment; however, these effects would be temporary and not adverse.

For Streetcar Alternative 1, the removal of a portion of the existing 70 parking spaces along 4th Street would be required. Parking Scenario A (conversion to parallel parking) would remove 10 parking spaces. Parking Scenario B (no south side parking) would remove

33 parking spaces. Parking Scenario C (no south or north side parking) would remove 66 parking spaces. The parking analysis discussed in Section 3.10 (Traffic and Parking) found that there was sufficient off-street parking to offset this removal in parking spaces and satisfy parking demand. Therefore, no adverse parking effects would occur to this community. Regardless, an adverse effect could occur to EJ populations within this segment if the lost parking disproportionately affected businesses that relied on short-term parking durations and a subsequent high volume of traffic. Such businesses would include newsstands, convenience stores, dry cleaners, coffee shops, and banks. A business inventory was conducted along 4th and 5th Streets to see if these land uses along 4th and 5th Streets are disproportionately reliant on short-term uses. Along 4th Street, three of the approximate 49 ground floor businesses contain short-term uses. Along 5th Street, one of the four businesses contained short-term uses. This proportion of short-term uses indicates that the removal of on-street parking would not result in adverse effects to EJ populations within this neighborhood.

At Brown and Garfield Streets, James Garfield Elementary School is located adjacent to the Streetcar Alternative 2 alignment. The streetcars would be traveling on embedded tracks in front of the school, where parents would pick-up/drop-off their children. A station would also be located in front of the pick-up/drop-off area. A potential safety concern would be related to passenger vehicles accessing Brown Street from the school. Sections 3.1 through 3.4 and 3.6 through 3.16 determined that no adverse health and environmental effects from land use, recreational resources, visual quality, cultural resources, geotechnical and hazardous materials, hydrology, traffic, noise and vibration, air quality and greenhouse gases. Measures are identified in Sections 3.15 (Safety and Security) and 3.16 (Construction) to ensure that no adverse environmental effects would occur which would divide the community or disrupt community character and cohesion. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects to the Lacy Neighborhood. Because no adverse effects would occur to this community, the effects to EJ populations within this community would not be disproportionately high and adverse.

Washington Square Neighborhood. Streetcar Alternatives 1 and 2 would be located within one-quarter mile of the Washington Square Neighborhood, located north of Civic Center Drive from Bristol to Flower Streets. Land uses are primarily low-density residential with institutional uses along Civic Center Drive. Sections 3.1 through 3.4 and 3.6 through 3.16 determined that no adverse health and environmental effects from land use, displacement and economic effects, recreational resources, visual quality, cultural resources, geotechnical and hazardous materials, hydrology, traffic and parking, noise and vibration, air quality and greenhouse gases, and safety and security. Because no adverse health and environmental effects would occur to these residences, which contain EJ populations, Streetcar Alternatives 1 and 2 would not divide the community or disrupt community character and cohesion. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects to the Washington Square Neighborhood. Because no adverse effects would occur to this community, the effects to EJ populations within this community would not be disproportionately high and adverse.

Flower Park Neighborhood. Streetcar Alternatives 1 and 2 would enter the Flower Park Neighborhood from Bristol Street to Flower Street. Within the Flower Park Neighborhood, land uses adjacent to the alignments include residential, commercial, and public facilities uses. Twenty-two of the existing 52 on-street parking spaces would be removed in this neighborhood for Streetcar Alternatives 1 and 2. Every residential unit along this segment has on-site parking capacity consistent with the City of Santa Ana's occupancy entitlements. Therefore, the loss of on-street parking would not adversely affect this neighborhood or the EJ populations within the neighborhood. Sections 3.1 through 3.4 and 3.6 through 3.16 determined that no adverse health and environmental effects from land use, displacement and economic effects, recreational resources, visual quality, cultural resources, geotechnical and hazardous materials, hydrology, traffic and parking, noise and vibration, air quality and greenhouse gases, and safety and security. Because no adverse health and environmental effects would occur to these residences, which contain EJ populations, Streetcar Alternatives 1 and 2 would not divide the community or disrupt community character and cohesion. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects to the Flower Park Neighborhood. Because no adverse effects would occur to this community, the effects to EJ populations within this community would not be disproportionately high and adverse.

Artesia Pilar Neighborhood. Streetcar Alternatives 1 and 2 would enter the Artesia Pilar Neighborhood east of Fairview Street. Adjacent land uses include residential, commercial, and industrial uses. Three partial acquisitions of two commercial uses and a single-family residence, and three full parcel acquisitions of two industrial uses and a six-unit multi-family residence would be required for O & M Facility Site B. Given that the residential parcel is zoned for industrial use, and these structures may have been allowed to remain with a variance, it is unlikely that they were designated as affordable housing units. Therefore, removal of these units would not reduce the affordable housing stock of the City of Santa Ana. Furthermore, these acquisitions would not alter the character or cohesion of the existing neighborhood.

Two schools would be adjacent to the proposed alignments within the Artesia Pilar Neighborhood: Romero Cruz Elementary School (located south of Santa Ana Boulevard between Forest Street and Pacific Avenue), and George Washington Carver Elementary School (located north of Santa Ana Boulevard between Pacific Avenue and Bristol Street). The streetcar would travel on embedded track in front of Romero Cruz School. The pick-up/drop-off area is accessed from both Santa Ana Boulevard and Forest Avenue. A potential safety concern would be related to passenger vehicles accessing Santa Ana Boulevard from the school. A 21.5-foot pick-up/drop-up area would be designated between the George Washington Carver School and the tracks. The potential safety concern would be related to passenger vehicles accessing Santa Ana Boulevard from the school pick-up/drop-up area. Construction of O & M Facility Site B would require the demolition of existing industrial uses. This construction activity would not export soil which would require haul trucks but could result in exposure to hazardous materials and temporary construction noise effects to the neighborhood or the EJ populations within the neighborhood.

Fifty-one of the existing 91 on-street parking spaces would be removed in this neighborhood under Streetcar Alternatives 1 and 2. Every residential unit along this segment has on-site parking capacity consistent with the City of Santa Ana's occupancy entitlements. Therefore, the loss of parking would not adversely affect this neighborhood. Four adverse noise effects would occur to residential receivers within this neighborhood from noise associated with warning horns and O & M Facility Site B; however, these effects would be mitigated to not adverse. Measures are identified in Sections 3.9 (Hazardous Materials), 3.11 (Noise and Vibration), 3.15 (Safety and Security), and 3.16 (Construction) to ensure that no adverse environmental effects would occur. Sections 3.1 through 3.4 and 3.6 through 3.16 determined that no additional adverse health and environmental effects from land use, recreational resources, visual quality, cultural resources, geotechnical and hazardous materials, hydrology, traffic, noise and vibration, air quality and greenhouse gases. Because no adverse health and environmental effects would occur to these residences, which contain EJ populations, Streetcar Alternatives 1 and 2 would not divide the community or disrupt community character and cohesion. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects to the Artesia Pilar Neighborhood. Because no adverse effects would occur to this community, the effects to EJ populations within this community would not be disproportionately high and adverse.

Willard Neighborhood. Streetcar Alternatives 1 and 2 would be located within one-quarter mile of the Willard Neighborhood which is located north of Civic Center Drive from Flower to Main Streets. Land uses are primarily multi-family residential and office uses. Alternative 2 would require three partial parcel acquisitions consisting of office and parking uses. The extent of this limited acquisition would not alter the character or cohesion of the existing neighborhood. Sections 3.1 through 3.4 and 3.6 through 3.16 determined that no adverse health and environmental effects from recreational resources, visual quality, cultural resources, geotechnical and hazardous materials, hydrology, traffic and parking, noise and vibration, air quality and greenhouse gases, and safety and security. Because no adverse health and environmental effects would occur to these residences, which contain EJ populations, Streetcar Alternatives 1 and 2 would not divide the community or disrupt community character and cohesion. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects to the Willard Neighborhood. Because no adverse effects would occur to this community, the effects to EJ populations within this community would not be disproportionately high and adverse.

Santa Anita Neighborhood. Streetcar Alternatives 1 and 2 would cross Westminster Avenue on an elevated guideway and return to grade, traveling in the median of the PE ROW. Residential uses in this neighborhood are located south of Westminster Avenue. One partial acquisition would be required from an industrial use for a traction power substation. The extent of this limited acquisition would not alter the character or cohesion of the existing neighborhood. The elevated guideway would be visible from the rear of approximately five residences along Bewley Street. There is an existing six-foot wall along the PE ROW that partially blocks the view to the north. The view to the north is of the Westminster Avenue commercial street corridor. A 17-foot retaining wall associated with the elevated alignment

would block the view of commercial buildings (not typically considered a scenic resource) to the north for these residences. Sections 3.1 through 3.4 and 3.6 through 3.16 determined that no adverse health and environmental effects from displacement and economic effects, recreational resources, cultural resources, geotechnical and hazardous materials, hydrology, traffic and parking, noise and vibration, air quality and greenhouse gases, and safety and security. Because no adverse health and environmental effects would occur to these residences, which contain EJ populations, Streetcar Alternatives 1 and 2 would not divide the community or disrupt community character and cohesion. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects to the Santa Anita Neighborhood. Because no adverse effects would occur to this community, the effects to EJ populations within this community would not be disproportionately high and adverse.

Downtown Santa Ana Neighborhood. Streetcar Alternatives 1 and 2 would enter the Downtown Santa Ana Neighborhood at Flower Street. Within the Downtown Neighborhood, land uses immediately adjacent to the proposed alignments include primarily commercial and public facilities. Sassafras Park is located directly adjacent to the proposed alignments along Santa Ana Boulevard at Ross Street. Access to the park would not be affected by the implementation of Streetcar Alternatives 1 and 2.

Streetcar Alternative 1 includes three parking scenarios. Fourth Street Parking Scenario A would reconfigure south side parking from diagonal to parallel, resulting in the loss of approximately 21 percent of spaces (47 parking spaces). Fourth Street Parking Scenario B would remove south side parking, resulting in the loss of approximately 57 percent of spaces (77 parking spaces). Fourth Street Parking Scenario C would remove the majority of south and north side parking, resulting in the loss of approximately 97 percent of spaces (132 parking spaces). The parking analysis found that there was sufficient off-street parking to offset this removal in parking spaces and satisfy parking demand. Regardless, an adverse effect could occur to EJ populations within this segment if the lost parking disproportionately affected businesses that relied on short-term parking durations and a subsequent high volume of traffic. Such businesses would include newsstands, convenience stores, dry cleaners, coffee shops, and banks. A business inventory was conducted along 4th and 5th Streets to see if these land uses along 4th and 5th Streets are disproportionately reliant on short-term uses. Along 4th Street, four of the approximate 54 ground floor businesses contain short term uses. Along 5th Street, two of the twelve businesses contained short term uses. This proportion of short-term uses indicates that the removal of on-street parking and sufficient off-street parking inventory would not result in adverse effects to this neighborhood. Sections 3.1 through 3.4 and 3.6 through 3.16 determined that no adverse health and environmental effects from land use, visual quality, cultural resources, geotechnical and hazardous materials, hydrology, traffic, noise and vibration, air quality and greenhouse gases, and safety and security. Because no adverse health and environmental effects would occur to these residences, which contain EJ populations, Streetcar Alternatives 1 and 2 would not divide the community or disrupt community character and cohesion. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects to the Downtown Santa Ana

Neighborhood. Because no adverse effects would occur to this community, the effects to EJ populations within this community would not be disproportionately high and adverse.

Mar-Les Neighborhood. Streetcar Alternatives 1 and 2 would enter the southern border of the Mar-Les Neighborhood as it approaches the Santa Ana River to the east, adjacent to low-density residences. Near these residences, the alignment would be at-grade within the PE ROW. Sections 3.1 through 3.4 and 3.6 through 3.16 determined that no adverse health and environmental effects from land use, displacement and economic effects, recreational resources, visual quality, cultural resources, geotechnical and hazardous materials, hydrology, traffic and parking, noise and vibration, air quality and greenhouse gases, and safety and security. Because no adverse health and environmental effects would occur to these residences, which contain EJ populations, Streetcar Alternatives 1 and 2 would not divide the community or disrupt community character and cohesion. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects to the Mar-Les Neighborhood. Because no adverse effects would occur to this community, the effects to EJ populations within this community would not be disproportionately high and adverse.

French Park Neighborhood. Streetcar Alternatives 1 and 2 would be located within one-quarter mile of the French Park Neighborhood which is located north of Civic Center Drive from Main to Santiago Streets. Land uses are primarily multi-family residential with some industrial along Santiago Street. One full parcel acquisition containing a fast food restaurant would be required for Alternative 2. The extent of this limited acquisition would not alter the character or cohesion of the existing neighborhood. Sections 3.1 through 3.4 and 3.6 through 3.16 determined that no adverse health and environmental effects from recreational resources, visual quality, cultural resources, geotechnical and hazardous materials, hydrology, traffic and parking, noise and vibration, air quality and greenhouse gases, and safety and security. Because no adverse health and environmental effects would occur to these residences, which contain EJ populations, Streetcar Alternatives 1 and 2 would not divide the community or disrupt community character and cohesion. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects to the French Park Neighborhood. Because no adverse effects would occur to this community, the effects to EJ populations within this community would not be disproportionately high and adverse.

French Court Neighborhood. Streetcar Alternatives 1 and 2 would be located within one-quarter mile of the French Court Neighborhood which is located north of Washington Street from Main to Santiago Streets. Land uses are primarily medium- and high-density residential. Sections 3.1 through 3.4 and 3.6 through 3.16 determined that no adverse health and environmental effects from land use, displacement and economic effects, recreational resources, visual quality, cultural resources, geotechnical and hazardous materials, hydrology, traffic and parking, noise and vibration, air quality and greenhouse gases, and safety and security. Because no adverse health and environmental effects would occur to these residences, which contain EJ populations, Streetcar Alternatives 1 and 2 would not divide the community or disrupt community character and cohesion. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects to the French Court Neighborhood. Because no

adverse effects would occur to this community, the effects to EJ populations within this community would not be disproportionately high and adverse.

SARTC East Neighborhood. Streetcar Alternatives 1 and 2 would be located within one-quarter mile of the SARTC East Neighborhood which is located east of Santiago Street. Land uses are primarily industrial and residential. Sections 3.1 through 3.4 and 3.6 through 3.16 determined that no adverse health and environmental effects from land use, displacement and economic effects, recreational resources, visual quality, cultural resources, geotechnical and hazardous materials, hydrology, traffic and parking, noise and vibration, air quality and greenhouse gases, and safety and security. Because no adverse health and environmental effects would occur to these residences, which contain EJ populations, Streetcar Alternatives 1 and 2 would not divide the community or disrupt community character and cohesion. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects to the SARTC East Neighborhood. Because no adverse effects would occur to this community, the effects to EJ populations within this community would not be disproportionately high and adverse.

Santa Ana River East Neighborhood. Streetcar Alternatives 1 and 2 would travel through the Santa Ana River East Neighborhood as it travels east across the Santa Ana River. The Santa Ana River Trail, Spurgeon School, and the Santa Ana Unified School District offices are adjacent to the alignment. Single-family residences are located to the north of the school district offices. Access to the river trail would continue to occur with implementation of Streetcar Alternatives 1 and 2. Construction of the adjacent single track bridge would export some soil and require haul trucks. Construction activity would also result in temporary visual and noise effects. An adverse noise effect from warning horns would occur to the athletic field at Spurgeon School. In front of Spurgeon School, a potential safety concern would be related to streetcar riders being picked-up or dropped-off along Fairview Street, which does not have a parking lane. Measures are identified in Sections 3.11 (Noise and Vibration), 3.15 (Safety and Security), and 3.16 (Construction) to ensure that no adverse environmental effects would occur. Sections 3.1 through 3.4 and 3.6 through 3.16 determined that no additional adverse health and environmental effects from land use, displacement and economic effects, recreational resources, cultural resources, geotechnical and hazardous materials, hydrology, traffic and parking, air quality and greenhouse gases. Because no adverse health and environmental effects would occur to these residences, which contain EJ populations, Streetcar Alternatives 1 and 2 would not divide the community or disrupt community character and cohesion. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects to the Santa Ana River East Neighborhood. Because no adverse effects would occur to this community, the effects to EJ populations within this community would not be disproportionately high and adverse.

Garden Grove Southeast Neighborhood. Streetcar Alternatives 1 and 2 would begin in a primarily commercial/industrial area at the Harbor Boulevard/Westminster Avenue intersection. Two auto-related businesses are located within the PE ROW and their leases would be terminated by OCTA. This would not alter the character or cohesion of the existing

neighborhood. Approximately 50 parking spaces would be provided to reduce potential spillover parking spaces at the western terminus of the line. The alignment would cross Westminster Avenue on an elevated guideway and return to grade in the median of the PE ROW. Construction of the aerial guideway would require the excavation and hauling of dirt to construct the foundation and retaining walls. Haul trucks would travel along Westminster Avenue and Harbor Boulevard and would not affect sensitive receptors on adjacent streets. Residential uses, including a mobile home park and multi-family housing, are located in this area north of the PE ROW between Clinton and Buena Streets. Near these residences, the alignment would be at-grade within the PE ROW and no adverse environmental effects would occur. Sections 3.1 through 3.4 and 3.6 through 3.16 determined that no adverse health and environmental effects from recreational resources, visual quality, cultural resources, geotechnical and hazardous materials, hydrology, traffic, noise and vibration, and safety and security. Because no adverse health and environmental effects would occur to these residences, which contain EJ populations, Streetcar Alternatives 1 and 2 would not divide the community or disrupt community character and cohesion. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects to the Garden Grove Southeast Neighborhood. Because no adverse effects would occur to this community, the effects to EJ populations within this community would not be disproportionately high and adverse.

Summary of Effects to Communities and EJ Populations

Streetcar Alternatives 1 and 2 would be located along or within existing transportation right-of-way, including the PE ROW, 4th and 5th Streets, Civic Center Drive, and Santa Ana Boulevard, mirroring the existing transportation corridor character and would not divide communities within the Study Area. Station design would be consistent with the surrounding community and neighborhood character, and would support existing development. Planned or future development and redevelopment near project stations would adhere to local land use plans and zoning designations and ordinances.

Streetcar Alternatives 1 and 2 would result in property acquisition, reduction of on-street parking spaces, and the potential to slightly alter the appearance of the existing setting. Property acquisition and visual modifications result in adverse effects minimized by a Best Management Practice in Section 3.3 (Land Acquisition and Displacements). The reduction of on-street parking spaces is not considered an adverse impact since it is offset by adequate, easily accessible parking is available in City-owned parking structures. Visual effects are minimized with project design features which include lighting fixtures architecturally integrated with the character of the surrounding environment.

Although Streetcar Alternatives 1 and 2 would provide improved mobility and access to communities in accordance with adopted transportation and land use plans, it would not introduce a new population to these areas to increase demand for parks, schools, hospitals/medical facilities, libraries, or affect community response times for fire, ambulance, and police services. In addition, the project alignment would not disrupt or impair access to community facilities and services. Streetcar Alternatives 1 and 2 would cross the Santa Ana

River and recreational trail and may require the river placement of bridge support columns. The bridge placement would not diminish the Santa Ana River area function and enjoyment.

Streetcar Alternatives 1 and 2 would increase connectivity among all of these communities their proposed alignments would traverse. These alternatives result in the **addition of a pedestrian bridge at Green Drive**, a pedestrian easement at Jackson Street, sidewalk and pedestrian walkway improvements in the vicinity of the proposed stations, and **reconstruction of a closed Santa Ana River Bridge** which would connect opposite sides of the Santa Ana River. Streetcar Alternatives 1 and 2 would also provide transit linkage to a number of public use areas and activity centers (e.g., Santa Ana Civic Center, the City Library, Santa Ana Stadium, and Downtown Santa Ana buildings) through the provision of a transit system which connects existing land uses in the area, and provides improved transportation access options to public use areas and activity centers.

Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects to the community character or cohesion and EJ populations within these neighborhoods. Because no adverse effects would occur to these communities, the effects to EJ populations would not be disproportionately high and adverse. Furthermore, beneficial effects related to community connectivity and increased mobility would occur, as described below.

Beneficial Effects

Benefits common to Streetcar Alternatives 1 and 2 would include increased accessibility and decreased congestion on many local streets, improved air quality, and potential for economic development around the proposed stations. Streetcar Alternatives 1 and 2 would increase connectivity and improve travel times between neighborhoods and businesses within the Study Area, as well as develop linkages with neighborhoods and employment locations system-wide. This is particularly important to the Study Area neighborhoods, which are all minority and low-income, containing more transit dependent populations compared to the County in general.

Public Outreach

Extensive public outreach during the planning process has occurred in the Study Area and included specific outreach for communities of environmental justice concern, particularly LEP communities. The following activities were conducted specifically to ensure participation from communities of environmental justice concern, per requirements under Executive Orders 12898 and 13166:

- Identifying and meeting with environmental justice stakeholders, including Templo Calvario, neighborhood associations, labor union members and senior centers.
- Establishing a project information hotline with outgoing messages in English and Spanish.
- Translating and submitting notices for publication in the following local Spanish language newspapers:
 - Excelsior (Spanish language weekly of the Orange County Register on May 24, 2010)
 - *Miniondas* (June 3, 2010)

- Making notices and information available in the Public Law Center’s website. The Public Law Center is a pro-bono law firm serving low-income communities in the City of Santa Ana and in the County of Orange (<http://www.publiclawcenter.org/news.php?headline=More+Public+Transportation+Coming+to+Santa+Ana>).
- Translating presentation boards during scoping meetings, which followed an open house format. Exhibit 7, in the Community Impact Assessment included as Appendix C, provides samples of these boards.
- Making available City of Santa Ana and subconsultant staff who were fluent in Spanish and were familiar with the proposed project and its stakeholders at the scoping meetings. Given the open house format of these scoping meetings, no real-time translation services were required as no formal presentations were given. However, Spanish-speaking staff was on hand to assist LEP community members.
- Translating comment forms on which community members could submit any comments, in English or Spanish.

The outreach to EJ populations shall continue throughout the environmental process consistent with past practice.

3.5.2.4 IOS-1 and IOS-2

The alignments associated with IOS-1 and IOS-2 would terminate at Raitt Street and Santa Ana Boulevard. With the exception of the Garden Grove, Santa Anita, Mar-Les, and Santa Ana River East Neighborhoods, the proposed alignments under IOS-1 and IOS-2 would traverse the same neighborhoods as the proposed alignments under Streetcar Alternatives 1 and 2.

Since the IOS options do not involve development of the PE ROW, visual, construction, and acquisition effects of the IOS-1 and IOS-2 that occur to the Garden Grove Southeast, Santa Anita, Mar Les, and Santa Ana River East Neighborhoods would not occur. Acquisition of full parcels remains the same under IOS-1 and IOS-2. Parking, circulation, noise, access, and air quality effects would be similar to those identified for Streetcar Alternatives 1 and 2.

3.5.3 Measures to Minimize Harm

The community analysis determined that Streetcar Alternatives 1 and 2 would not result in adverse effects to neighborhoods within the Study Area. No mitigation measures would be required. Since no adverse effects were found to occur, effects to minority and low-income populations would not be disproportionately high and adverse.

3.5.4 CEQA Determination

3.5.4.1 Significance Criteria and Significance Criteria Application

In accordance with Appendix G of the State CEQA Guidelines, the proposed project would have a significant impact related to public services if it would:

- 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

The impacts to community facilities within neighborhoods were analyzed as part of the totality of effects to neighborhoods as it relates to community effects and environmental justice described in the preceding section. The following analysis focuses on the effects to community facilities. Refer to Section 3.15 (Safety and Security) for a discussion of school safety.

No Build Alternative

The streetcar would not operate under the No Build Alternative, and consequently, there would not be related effects on public services. Therefore, the No Build Alternative would result in no impacts related to public services.

TSM Alternative

The TSM Alternative would not involve minor improvements that would affect public services. Therefore, the TSM Alternative would result in no impacts related to public services.

Streetcar Alternatives 1 and 2

Fire and Police Protection. Streetcar Alternatives 1 and 2 would not introduce a new population which would create additional demand for police and fire services. Streetcar Alternatives 1 and 2 are not anticipated to create additional demand for fire services; although an increased demand for security personnel may occur. However, it is expected that the existing police and fire facilities would be adequate and no new facilities would be required as a result of Streetcar Alternatives 1 and 2.

Streetcar Alternatives 1 and 2 would include security-oriented design features, such as perimeter fencing around the selected O & M Facility Site. A Crime Prevention through Environment Design program would be implemented during final design that includes natural access control, natural surveillance, territoriality, and maintenance to create a safety environment. Natural surveillance entails keeping activity and passengers visible at the stations and incorporating pedestrian-friendly designs that allow the general public, transit personnel, and transit riders to contribute to surveillance in and around the station area. In addition, all streetcar operators would participate in a safety/security training program and surveillance cameras may be installed inside streetcar vehicles. These design features, along with police security patrols, will substantially reduce the risk for criminal activities on

streetcars, at transit stations, and at the selected O & M Facility Site. Therefore, the Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to streetcar security.

Streetcar Alternatives 1 and 2 would not alter emergency response times given the wide distribution of emergency facilities throughout the Study Area. Crossing gates for the streetcar would generally not be down for a period of more than 30 seconds. It is likely that emergency vehicles would switch to the other side of the street particularly when there are median extensions. Should the at-grade crossing be inaccessible for a substantial duration, emergency vehicles could access multiple alternative routes within the Study Area based on the well defined street grid. Therefore, the Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to emergency response times.

Schools. Although Streetcar Alternatives 1 and 2 would provide improved mobility and access to the Study Area in accordance with adopted transportation and land use plans, these improvements would not result in substantial growth of the local student population. These alternatives would not necessitate the need for new schools. Therefore, Streetcar Alternatives 1 and 2 Alternative would result in no impacts related to new schools.

Title 5 of the California Code of Regulations includes standards that apply to the selection of new school sites. While not directly applicable to the proposed project, it is important that Streetcar Alternatives 1 and 2 not cause significant environmental impacts to schools. Section 14010(c) lists distances that new schools should be located from power lines. The first standard listed is 100 feet from a 50 to 133 kilovolt line. The Streetcar Alternatives 1 and 2 power system would support 0.6 to 0.8 kilovolt. This would be approximately 62 times less than the minimum kilovolts listed in Title 5. Therefore, Streetcar Alternatives 1 and 2 Alternative would result in no impacts related to power lines and schools.

Parks. Although the project would improve mobility and access to communities in accordance with adopted transportation and land use plans, it would not introduce a new population to these areas that could increase demand for parks or require the provision of new parkland. In addition, the project alignment would not disrupt or impair access to parks. Portions of the project located outside of the existing transportation right-of-way would require some land acquisitions and easements; however, new land and easements acquired by the project would not displace parkland. Therefore, Streetcar Alternatives 1 and 2 would result in no impacts related to parks.

Other Public Facilities. Streetcar Alternatives 1 and 2 do not involve the construction of new or physically altered governmental facilities. There are sufficient existing facilities to serve the Study Area and Streetcar Alternatives 1 and 2 would not impair the functioning of or access to public facilities.

There are two federal buildings located near Streetcar Alternatives 1 and 2. The streetcar system will be designed so as not to inhibit the function or access to the Ronald Reagan Federal Building and United States Courthouse or the Santa Ana Federal Building. Such design

measures include providing overhead wires and spacing of poles at a height and distance that will provide adequate clearance for all vehicles that would require entry into the federal buildings. The station near Santa Ana Boulevard and Ross Street will be at an adequate distance from the federal buildings so that a safety buffer is provided. Access to federal buildings shall be maintained during construction and operation and emergency access shall be prioritized. Additional safety measures, such as signage, education for operators, and lower operating speed shall also be incorporated to ensure the safe operation of the federal buildings. With implementation of these design features, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts to the federal buildings.

Streetcar Alternatives 1 and 2 would improve regional transit access to public service facilities in the Study Area, including schools, parks and recreation areas, hospitals and community health facilities. The Willowick Public Golf Course, Spurgeon Intermediate School, George Washington Carver Elementary School, Santa Ana Civic Center, Santa Ana Public Library, OCTA Park and Ride Parking Structure, and SARTC are all within walking distance of proposed stations. These public service facilities would benefit directly from the improved transit services and access to the populated areas, specifically in the Downtown Santa Ana area near the Civic Center where a number of public governmental agencies are located. The Streetcar Alternatives have been designed to ensure that no adverse effects would occur to these facilities. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to public services.

IOS-1 and IOS-2

Similar to Streetcar Alternatives 1 and 2, IOS-1 and IOS-2 would improve regional transit access to public service facilities in the Study Area. However, access by streetcar would no longer be available west of Raitt Street, including the City of Garden Grove. Regardless, public service facilities east of Raitt Street would benefit directly from the improved transit services. In addition, there are sufficient existing facilities to serve the Study Area and acceptable service ratios, response times and other performance objectives for fire, police, schools, parks, or other public facilities would be maintained under the IOS Alternatives. Therefore, IOS-1 and IOS-2 would result in less-than-significant impacts related to public services.

3.5.4.2 Significance After Mitigation

Impacts related to public services were determined to be less than significant. No mitigation measures are required.

3.6 Visual Quality

This section provides an overview of the landscape setting of the Study Area and the visual resources within it. This section was prepared utilizing the Visual Impact Assessment (VIA) included as Appendix E. The analysis is based on the project features within the affected environment, and evaluates operational impacts associated with the proposed project.

3.6.1 Affected Environment

3.6.1.1 Area Topography and Landform

The topography in the Study Area is relatively flat. It is highly urbanized and contains a broad mix of land uses, including light industrial/commercial properties, single- and multi-family residences, manufactured housing, government and public facilities, and recreational facilities. Structures generally are one to three stories in height, with the exception of the Downtown Santa Ana area, where some buildings are in greater than five stories in height. Scenic views in and around the Study Area consist of parks and other recreational areas. With the exception of the Santa Ana River, no natural bodies of water are located in or near the Study Area. Because of the built-out environment and the minimal variation in topography (and resultant lack of elevated vantage points), views are limited to the foreground and middle-ground, with no long-range or background views.

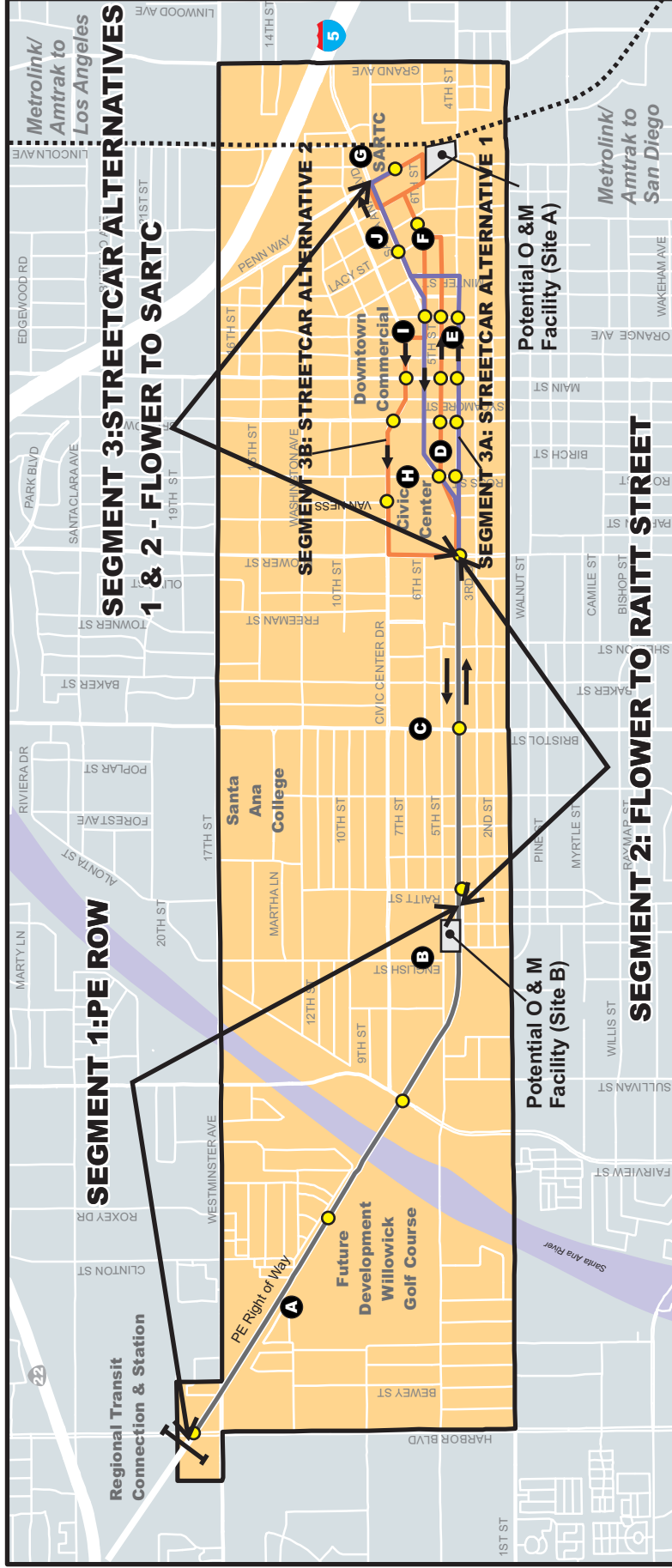
To provide a framework for analyzing the visual environment, the potential alignments are described in terms of the overall visual landscape, and have also been divided into similar segments and visual character areas, as shown in **Figure 3.6-1**:

- Segment 1: PE ROW – Streetcar Alternatives 1 and 2
- Segment 2: Raitt Street to Flower Street – Streetcar Alternatives 1 and 2
- Segment 3: Downtown Santa Ana
 - Segment 3A: Streetcar Alternative 1
 - Segment 3B: Streetcar Alternative 2

A brief textual summary of the visual character areas by segment is provided below. Detailed information, including character, views, visual elements, and visual quality, is provided in **Table 3.6-1**. The assessment of visual quality was based on the cohesion or variation in form, the level of upkeep or deterioration of the built environment, and the level of landscaping and visual attractiveness. Visual quality is rated low, moderate low, moderate, moderate high, or high. These ratings reflect condition of the area, landscaping and overall visual attractiveness.

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Alignment Segments for Visual Assessment



Source: Cordoba Corporation, Draft Alternatives Analysis Report for the Santa Ana-Garden Grove Fixed Guideway Corridor Study, April, 2014.

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TABLE 3.6-1: CHARACTER OF VIEWS BY SEGMENT

Visual Character Area	Boundaries	Land Use/Viewer Group Along Area	Scale of Adjacent Development	Visual Resources (Views and Elements)	Visual Quality
SEGMENT 1 – PE ROW					
A	Western Terminus (Harbor Boulevard/Westminster Avenue intersection) to Fairview Street	commercial, residential, recreational, educational	low-rise	<p>Sensitive Viewers: Motorists, pedestrians/joggers, bicyclists and recreational users along the Santa Ana River Trail, the residents in neighborhoods surrounding the bridge and trail, the adjacent Spurgeon Park, and the Spurgeon Intermediate School.</p> <p>Views: Adjacent commercial and residential development.</p> <p>Visual Elements: Roadways, trees along sides of roads, tree-lined streets, Willowick Public Golf Course, Santa Ana River, Santa Ana River Bridge, PE ROW, residential neighborhoods, Spurgeon Park.</p> <p>Scenic or Unique Vistas: Santa Ana River Bridge, Santa Ana River Trail.</p>	moderate low to moderate
B	Fairview Street to Raitt Street and 4 th Street/Santa Ana Boulevard intersection	commercial, light industrial, residential	low-rise	<p>Sensitive Viewers: Motorists, pedestrians, residents, and workers.</p> <p>Views: Adjacent commercial and residential development.</p> <p>Visual Elements: Fences surrounding light industrial properties, equipment associated with light industrial properties, single-family residential neighborhood, and manufactured housing.</p> <p>Scenic or Unique Vistas: None identified.</p>	low to moderate low
SEGMENT 2 – RAITT TO FLOWER STREETS					
C	Santa Ana Boulevard from Raitt to Flower Streets	residential, commercial, educational	low-rise to mid-rise	<p>Sensitive Viewers: Motorists, pedestrians, residents, and workers.</p> <p>Views: Nearby low- to mid-rise commercial development and adjacent residential development.</p> <p>Visual Elements: Roadways, trees, elementary schools, Santa Ana Stadium.</p> <p>Scenic or Unique Vistas: None identified.</p>	moderate low to moderate

TABLE 3.6-1: CHARACTER OF VIEWS BY SEGMENT

Visual Character Area	Boundaries	Land Use/Viewer Group Along Area	Scale of Adjacent Development	Visual Resources (Views and Elements)	Visual Quality
SEGMENT 3A – DOWNTOWN SANTA ANA, ALTERNATIVE 1					
D	Between Flower Street and Broadway (west to east) and Santa Ana Boulevard and 4 th Street (north to south)	commercial, recreational	low-rise to mid-rise	<p>Sensitive Viewers: Motorists, pedestrians, workers, and users of Sasscer Park.</p> <p>Views: Nearby low- to mid-rise commercial development and adjacent residential development.</p> <p>Visual Elements: Boulevards, trees, mid-rise buildings in Downtown Santa Ana, Sasscer Park.</p> <p>Scenic or Unique Vistas: Sasscer Park.</p>	moderate
E	Santa Ana Boulevard between Broadway and French Street, and 4 th Street between Broadway and French Street	Commercial (retail and office), residential, educational	low-rise	<p>Sensitive Viewers: Motorists, pedestrians, residents, and workers.</p> <p>Views: Nearby low-rise commercial development and adjacent residential development.</p> <p>Visual Elements: Shopping district on Fourth Street, commercial district approaching Downtown Santa Ana Historic District on Santa Ana Boulevard at French Street.</p> <p>Scenic or Unique Vistas: Downtown Santa Ana Historic District.</p>	low to moderate low
F	Santa Ana Boulevard between French and Poinsettia Streets, 4 th Street between French and Mortimer Streets, and Mortimer Street between Santa Ana Boulevard and 4 th Street	residential, vacant lots	low-rise	<p>Sensitive Viewers: Motorists, pedestrians, and residents.</p> <p>Views: Nearby low-rise commercial development and adjacent residential development.</p> <p>Visual Elements: Tree-lined streets, Garfield Elementary School, boarded-up buildings, vacant lots.</p> <p>Scenic or Unique Vistas: None identified.</p>	low to moderate low
G	Poinsettia Street to Eastern Terminus (SARTC)	multi-family residential, commercial/warehouse	low-rise	<p>Sensitive Viewers: Motorists, pedestrians, residents, and workers.</p> <p>Views: Nearby low-rise commercial development and adjacent residential development.</p> <p>Visual Elements: Roadways, SARTC, rail lines, trees, material recycling and transfer facility (site of prospective O&M facility).</p> <p>Scenic or Unique Vistas: SARTC.</p>	low to moderate

TABLE 3.6-1: CHARACTER OF VIEWS BY SEGMENT

Visual Character Area	Boundaries	Land Use/Viewer Group Along Area	Scale of Adjacent Development	Visual Resources (Views and Elements)	Visual Quality
SEGMENT 3B – DOWNTOWN SANTA ANA, ALTERNATIVE 2					
H	Between Flower Street and Broadway (west to east) and between Civic Center Drive and 5 th Street (north to south)	Commercial (government buildings, public buildings, private office buildings)	low-rise to mid-rise commercial development	<p>Sensitive Viewers: Motorists, pedestrians, and workers.</p> <p>Views: Nearby mid-rise commercial development.</p> <p>Visual Elements: Wide roadways, government buildings, public library, Santa Ana Stadium, Sasscer Park.</p> <p>Scenic or Unique Vistas: Sasscer Park.</p>	moderate
I	Civic Center Drive between Broadway and Spurgeon Street (west to east), Spurgeon Street between Civic Center Drive and Santa Ana Boulevard (north to south), Santa Ana Boulevard/6 th Street between Spurgeon Street and Minter Street (west to east), 5 th Street between Broadway and Minter Street (west to east), and Minter Street between 6 th and 5 th Streets (north to south)	commercial	low-rise to mid-rise	<p>Sensitive Viewers: Motorists, pedestrians, and workers.</p> <p>Views: Nearby mid-rise commercial development.</p> <p>Visual Elements: Roadways, French Park and Downtown Santa Ana Historic Districts.</p> <p>Scenic or Unique Vistas: French Park and Downtown Santa Ana Historic Districts.</p>	low moderate
J	6 th /Brown Streets between Minter and Poinsettia Streets, and Eastern Terminus (block encompassed by Poinsettia Street, Santa Ana Boulevard, Santiago Street, and 6 th Street)	multi-family residential, commercial/warehouse	low-rise	<p>Sensitive Viewers: Motorists, pedestrians, residents, and workers.</p> <p>Views: Nearby low-rise commercial development, adjacent residential development.</p> <p>Visual Elements: Northgate Grocery, narrow tree-lined streets, boarded-up buildings, vacant lots, SARTC, material recycling and transfer facility (site of prospective O&M Facility).</p> <p>Scenic or Unique Vistas: SARTC.</p>	low to moderate

Source: URS Corporation, SA-GG Fixed Guideway Project Visual Impact Assessment, February 2012.

The following discussion provides a detailed description of each visual character area. Photographs taken from selected view point locations within each segment, from west to east, within the boundaries of the proposed project alignment, are provided in Figures 2-1a through 2-7a of the VIA included as Appendix E. Locations from which these photos were taken within each segment are depicted in Figures 2-1b through 2-7b of the VIA.

Segment 1: PE ROW – Streetcar Alternatives 1 and 2

The boundaries of Segment 1 consist of either side of the PE ROW from the Harbor Boulevard/Westminster Avenue intersection on the northwest end to Raitt Street on the eastern end. This segment is divided into two visual character areas: A and B.

Visual Character Area A. This visual character area begins at the Harbor Boulevard/Westminster Avenue intersection and terminates at Fairview Street. It consists primarily of newer low-rise, mixed-use commercial development at the western end of the segment, followed by single-family residential development and manufactured housing on both sides of the PE ROW, and the Willowick Public Golf Course on the south side of the PE ROW. Immediately east of the golf course is the Santa Ana River, which includes the Old Pacific Electric Santa Ana River Bridge and the Santa Ana River Trail. The joint use Spurgeon Recreational Area is located east of the Santa Ana River on the southeast side of the PE ROW, followed to the east by the Spurgeon Intermediate School (Figure 2-1a and Figure 2-1b of the VIA). The visual quality of Visual Character Area A is moderate low to moderate.

Visual Character Area B. This visual character area begins at Fairview Street and terminates at the intersection of Raitt Street and 4th Street/Santa Ana Boulevard. Area B is an older area consisting of low-rise, mixed-use commercial development, and light industrial development (e.g., metal recycling) and commercial development (e.g., restaurants, auto repair facilities) adjacent to the PE ROW, with older single-family residences abutting the light industrial businesses. The light industrial businesses in this area are secured by perimeter fencing covered with nylon fabric, blocking views to the interiors of the properties (Figure 2-2a and Figure 2-2b of the VIA). The visual quality of Visual Character Area B is low to moderate low.

Segment 2: Raitt Street to Flower Street – Streetcar Alternatives 1 and 2

Visual Character Area C. The area along Santa Ana Boulevard east of Raitt Street to Flower Street is referred to as Visual Character Area C (Figure 2-3a and Figure 2-3b of the VIA) and consists of single-family residences interspersed with public schools (e.g., Carver Elementary School and the Romero Cruz Elementary School) and small one- and two-story commercial businesses (e.g., florist shop, small strip shopping center). A moderate number of trees are present along both sides of Santa Ana Boulevard. Vehicular traffic in this area is moderate and pedestrian traffic is limited. Historically, the PE Railway operated along Santa Ana Boulevard in this area. The visual quality of Visual Character Area C is moderate low to moderate.

Segment 3A: Downtown Santa Ana (Flower Street to SARTC) – Streetcar Alternative 1

The boundaries of Segment 3A consist of 4th Street on the southern end, Santa Ana Boulevard on the northern end, the east side of Flower Street on the western end, and Santiago Street on the eastern end. The PE Railway operated in this area along 4th Street and Santa Ana Boulevard. This segment is divided into four visual character areas: D, E, F and G, discussed below.

Visual Character Area D. The area between Flower Street and Broadway (west to east) and between Santa Ana Boulevard and 4th Street (north to south) are within the core of the Downtown Santa Ana commercial district (Figure 2-4a and Figure 2-4b of the VIA). Notable properties in this area include the Santa Ana Civic Center, located on the southwest corner of 4th Street and Ross Street, and Sasser Park, located adjacent to the area north of the Civic Center. In addition to the Civic Center, other public/government buildings in this area include the Superior Court, the Santa Ana City Jail, the Department of Health Services, and the Orange County Health Care Agency. Several parking structures and paved parking lots are present in this area. The eastern portion of 4th Street is within the Downtown Santa Ana Historic District and includes numerous buildings that are contributors to the Historic District. The historic structures contribute to the visual character of this area. Detailed information regarding historic properties can be found in the Cultural Resources Evaluation Report included as Appendix F of this document. The visual quality of Visual Character Area D is moderate.

Visual Character Area E. This visual character area includes the segment of Santa Ana Boulevard between Broadway and French Street and the segment of 4th Street between Broadway and French Street (Figure 2-4a and Figure 2-4b of the VIA). Portions of 4th Street and Santa Ana Boulevard between Broadway and Spurgeon Street are within the Downtown Santa Ana Historic District and include numerous buildings that are contributors to the historic district. Similar to Area D, the historic structures contribute to the visual character of this area. Santa Ana Boulevard between Broadway and French Street is also within the Santa Ana Business District. Notable properties on the north side of Santa Ana Boulevard include the Old Orange County Courthouse, the First Presbyterian Church, the Pacific Symphony Center (United Presbyterian Church) and the Spurgeon Post Office. Both sides of 4th Street, between Broadway and French Street, consist of a popular retail shopping area in Downtown Santa Ana, which is composed of many historic properties. This area is characterized by heavy pedestrian and vehicular traffic. The businesses in this area consist primarily of independent retail clothing and shoe stores (as opposed to the chain stores more typically found at newer shopping malls). The visual quality of Visual Character Area E is low to moderate low.

Visual Character Area F. This visual character area consists of a segment of Santa Ana Boulevard between French and Poinsettia Streets, a short segment of 4th Street between French Street and Mortimer Street, and a segment of Mortimer Street between Santa Ana Boulevard and 4th Street (Figure 2-5a and Figure 2-5b of the VIA). Along Santa Ana Boulevard between French and Poinsettia Streets, is a section of older primarily single-family

(one-story) and multi-family (two- to three-story) residences. Several vacant lots are also in this area, as were several abandoned buildings. These vacant lots and abandoned buildings had been boarded up and are located along both Santa Ana Boulevard and 6th Street and along the streets perpendicular to Santa Ana Boulevard and 6th Street. Several mature trees line the roadways in this area, providing a natural canopy. The block of 4th Street between French and Mortimer Streets contains a grocery store and residential buildings. At the 4th/Mortimer Streets intersection, Area F turns northward and follows Mortimer Street to where it rejoins Santa Ana Boulevard. This segment of Mortimer Street is characterized by surface parking lots, three-story multi-family apartment buildings, and abandoned single-family residences. The visual quality of Visual Character Area F is low to moderate low.

Visual Character Area G. The area east of Poinsettia Street to SARTC and Metrolink tracks consists of a mix of newer low-rise multi-family apartment buildings (on both sides of Santa Ana Boulevard west of Santiago Street), and low-rise commercial and warehouse-type buildings with associated paved parking lots. Several of the warehouse-type buildings and commercial buildings in this area are surrounded by fencing covered with nylon fabric, blocking views to the interior portions of the properties. The roadways in this area are lined with mature trees and offer street parking (Figure 2-5a and Figure 2-5b of the VIA). The visual quality of Visual Character Area G is low to moderate.

Segment 3B: Downtown Santa Ana (Flower Street to SARTC) – Streetcar Alternative 2

The boundaries of Segment 3B consist of 5th Street on the southern end, Civic Center Drive on the northern end, the east side of Flower Street on the western end, and Santiago Street on the eastern end. As previously stated, the PE Railway operated in this area, along 4th Street and Santa Ana Boulevard, until the 1950s. This segment is divided into three visual character areas: H, I, and J.

Visual Character Area H. The area between Flower Street and Broadway (west to east) and between Civic Center Drive and 5th Street (north to south) is within the core of the Downtown Santa Ana commercial district (Figure 2-6a and Figure 2-6b of the VIA). This area consists of low- to mid-rise government/public buildings, such as the Orange County Courthouse and the City of Santa Ana Public Library, low- to mid-rise office buildings, as well as several parking structures and surface parking lots. The Santa Ana Stadium is located at the southwest corner of Flower Street and Civic Center Drive. Few trees are located along the roadways in this area. There is a moderate amount of pedestrian and vehicular traffic in this area. Similar to Area D, notable properties in this area include the Santa Ana Civic Center, Sasser Park, and other public/government buildings, such as the Superior Court, the Santa Ana City Jail, the Department of Health Services, and the Orange County Health Care Agency (Figure 2-4a and Figure 2-4b of the VIA). The southwest corner of 5th Street and Broadway is within the Downtown Santa Ana Historic District and includes one building that a contributor to the historic district. The visual quality of Visual Character Area H is moderate.

Visual Character Area I. This visual character area consists of Civic Center Drive between Broadway and Spurgeon Street (west to east), the block of Spurgeon Street between Civic Center Drive and Santa Ana Boulevard (north to south), Santa Ana Boulevard/6th Street between Spurgeon Street and Minter Street (west to east), 5th Street between Broadway and Minter Street (west to east), and the block of Minter Street between 6th Street and 5th Street (north to south), as depicted in Figure 2-6a and Figure 2-6b of the VIA. The segment of Civic Center Drive between Broadway and Spurgeon Street is within the Downtown Santa Ana Historic District and includes several buildings that are contributors to the historic district. Notable buildings include the Old Orange County Courthouse, the Dr. Howe-Waffle House, the Episcopal Church of the Messiah, and the Spurgeon Station Post Office. A portion of the northwest corner of Civic Center Drive and Spurgeon Street is adjacent to the French Park Historic District. However, none of the buildings adjacent to the Streetcar Alternative 2 alignment are considered contributing resources to the historic district. The block of Spurgeon Street between Civic Center Drive and Santa Ana Boulevard is characterized by a large surface parking lot associated with the Spurgeon Station Post Office to the west and the First United Methodist Church to the east, which occupies the entire northeast corner of Spurgeon Street and Santa Ana Boulevard/6th Street. The area along Santa Ana Boulevard/6th Street, between Spurgeon Street and Minter Street, consists of single-family (one-story) and multi-family (two- to three-story) residential uses and religious uses.

Unlike 4th Street, 5th Street between Broadway and French Street is not a shopping area and is characterized primarily by low-rise commercial/office buildings. This area does not support heavy pedestrian or vehicular traffic and is substantially quieter than 4th Street. A small portion of 5th Street between Broadway and Main Street is within the Downtown Santa Ana Historic District and includes two buildings, the Masonic Temple and the Ramona Building, which are considered contributors to the historic district. The segment of 5th Street between French and Minter Streets includes a mixture of small commercial buildings and single- and multi-family residential buildings, as well as a few scattered vacant lots. At the 5th/Minter Streets intersection, Area I turns northward and follows Minter Street to 6th Street. This block of Minter Street is characterized by older single- (one-story) and multi-family (two- to three-story) residences, some of which have been abandoned, as well as vacant lots and older residential structures that have been abandoned and boarded up. The visual quality of Visual Character Area I is low moderate.

Visual Character Area J. This visual character area consists of 6th Street/Brown Street, between Minter and Poinsettia Streets, and the block encompassed by Poinsettia Street, Santa Ana Boulevard, Santiago Street, and 6th Street, which is located adjacent to and west of SARTC (Figure 2-7a and Figure 2-7b of the VIA). The segment of 6th Street, between Minter and Lacy Streets, is characterized by older one-story single-family residences, several which are abandoned and boarded up, a three-story apartment building on the south side, and a large vacant lot on the north side. Vacant lots and abandoned buildings are along the cross streets in this area. Garfield Elementary School is located on the southeast side of Brown Street, between Lacy and Garfield Streets. On the north side are a large vacant lot and a three-story apartment building. Several mature trees line the roadways in this area, providing

a natural canopy. The area along Brown Street, east of Garfield to Poinsettia Streets, and around the block encompassed by Poinsettia Street, Santa Ana Boulevard, Santiago Street, and 6th Street, consists of a mix of newer low-rise multi-family apartment buildings (on both sides of Santa Ana Boulevard west of Santiago Street), and low-rise commercial and warehouse-type buildings (e.g., Austin Hardwoods) with associated paved parking lots. Several of the warehouse-type buildings and commercial buildings in this area are surrounded by fencing covered with nylon fabric, blocking views to the interior portions of the properties. The roadways in this area are lined with mature trees and offer on-street parking. SARTC is located on the east side of Santiago Street. The visual quality of Visual Character Area J is low to moderate.

3.6.2 Environmental Consequences

3.6.2.1 No Build Alternative

The No Build Alternative takes existing conditions within the Study Area and adds future planned and funded transit and roadway improvement projects. Each of these future projects will be environmentally cleared through separate project-specific environmental documentation. While scenic vistas have been identified within the Study Area (e.g., Old Pacific Electric Santa Ana River Bridge, Santa Ana River Trail, Sasscer Park, French Park and Downtown Santa Ana Historic Districts, and SARTC), impacts related to adverse effects on scenic vistas or important aesthetic features from proposed or reasonably foreseeable development will be identified and each project environmentally cleared through separate project-specific environmental documentation. The streetcar would not operate under this alternative and there would not be related effects on visual quality. Therefore, the No Build Alternative would not result in adverse effects related to visual quality.

3.6.2.2 TSM Alternative

The TSM Alternative emphasizes low-cost improvements and operational efficiencies, such as focused traffic engineering actions, expanded bus service, and improved access to transit services. The TSM Alternative would involve small physical improvements and operational improvements, such as focused traffic engineering actions, expanded bus service, and improved access to transit services within the Study Area. The TSM Alternative also would include modifications and enhancements to selected bus routes in the Study Area, intersection/signal improvements, and bus stop amenity upgrades. Because of the minor nature of these improvements, the TSM Alternative would not involve improvements that would adversely affect a scenic vista or aesthetic features or substantially degrade the existing visual character or quality of the Study Area. In addition, it is not anticipated that the small physical and operational improvements described above would generate new sources of light or glare. Therefore, the TSM Alternative would not result in adverse effects related to visual quality.

3.6.2.3 Streetcar Alternatives 1 and 2

Visual Character Areas and Visual Quality

Each of the visual character areas would be affected by station infrastructure, overhead contact wire poles with catenary wires, new light poles, and additional traffic signals (similar to those shown in **Figures 3.6-2** through **3.6-4**) and TPSSs (**Figure 3.6-5**).

The installation of overhead contact wire poles with catenary wires, new light poles, and additional traffic signals along the entire length of the proposed project alignment would introduce new vertical elements to the PE ROW and Santa Ana Boulevard. These elements would be most visible to passing motorists and workers in nearby buildings along Westminster Avenue, Harbor Boulevard, and Nautilus Drive. However, both motorists and workers would have short-term views of these elements as they move through the area (driving, walking to their modes of transportation, or walking to their destination).

Similarly, along Santa Ana Boulevard, workers and patrons of commercial establishments, motorists, and pedestrians would have limited views of these vertical elements as they move through the area or visit commercial facilities. These vertical elements are not anticipated to diminish the visual quality of the Study Area, which is already characterized by heavy traffic in a built-up environment and would not result in adverse effects for Streetcar Alternatives 1 and 2.

The TPSSs that would be located throughout the Study Area would provide a moderate vertical element. The building dimensions of the TPSS sites would be 15 by 20 feet with a height of approximately 12 feet.

The substations would be located in areas that are commercial/light industrial in nature and of low to moderate low visual quality. Based on the nature of the areas in which the substations would be located, the substation structures would be consistent with the other structures and equipment typical of the location, as illustrated in Figure 3.6-5.

In addition, landscaping features and other features, such as walls and paint colors associated with the substation structure, would be selected to increase the visual compatibility of the proposed substations with the surrounding environment. TPSSs are not anticipated to diminish the visual quality of the Study Area and would not result in adverse effects for Streetcar Alternatives 1 and 2.

Visual Character Area A (Segment 1 – Streetcar Alternatives 1 and 2). The visual quality of Visual Character Area A is moderate low to moderate. In addition to the common vertical elements and TPSS, Visual Character Area A includes a proposed bridge on Westminster Avenue between Harbor Boulevard and Nautilus Drive (**Figure 3.6-6**), the Old Pacific Electric Santa Ana River Bridge, and the Santa Ana River Trail (**Figure 3.6-7**).

The proposed bridge over Westminster Avenue would consist of a single span, 220 feet long with a maximum height of 23 feet. Westminster Avenue in this area is a wide boulevard with a median landscaped with grass and several tall, mature trees.

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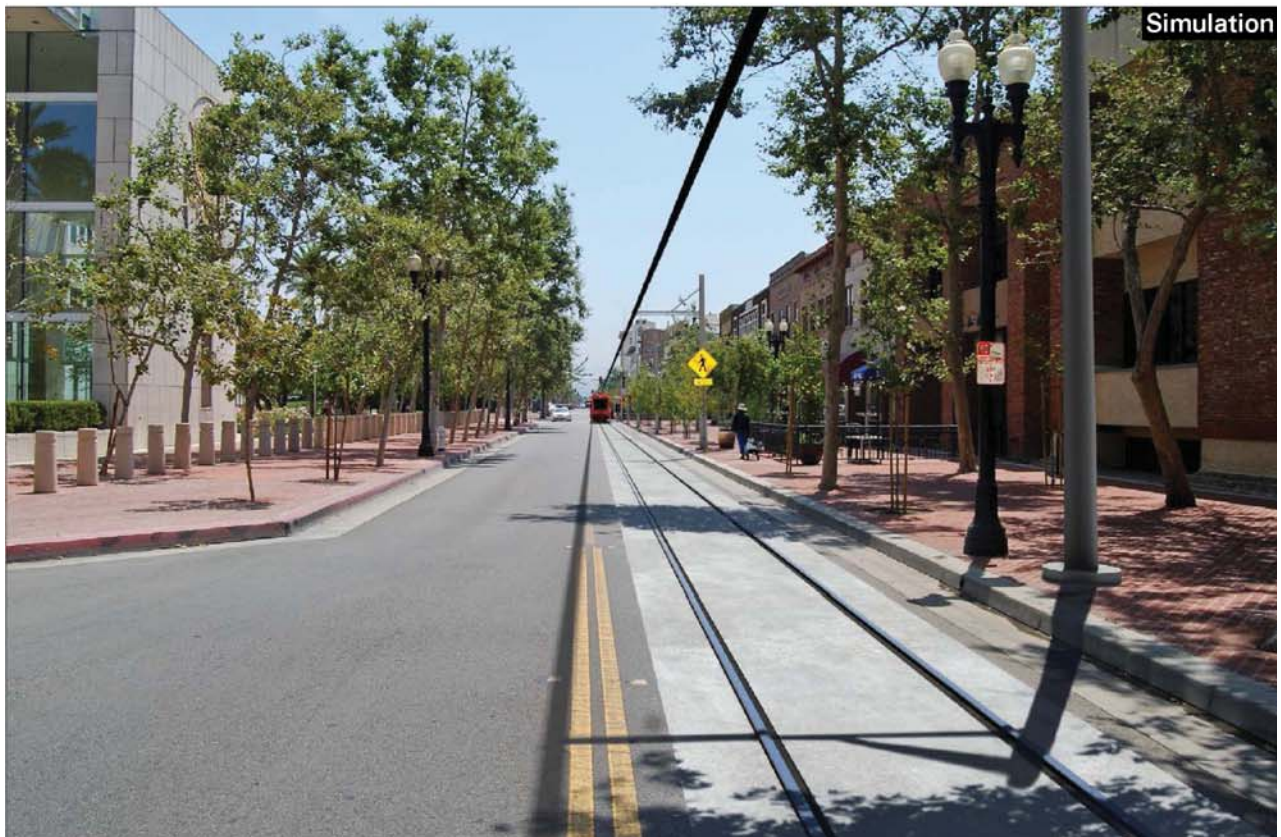
Station on Santa Ana Blvd East of Bristol Street



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Station on Southerly Side of Fourth Street East of Ross Street



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Station on Fourth Street Near Garfield Street



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Substation at Poinsettia and Brown



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Westminster Ave Bridge



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The mature trees would supply a vertical element consistent with the vertical element of the proposed bridge and would also screen/buffer views of the bridge by vehicular and pedestrian traffic. The bridge would be visible to residences south of Westminster Avenue and motorists driving along Westminster Avenue through this fairly high-traffic area. It is not anticipated that the bridge would be visible to residences northeast of the Harbor Boulevard/Westminster Avenue intersection. Motorists would have short-term views of the bridge while driving through the area. Furthermore, the contemporary and streamlined design of the proposed bridge would not diminish the visual quality of Visual Character Area A.

As shown in Figure 3.6-7, the construction of a new bridge immediately south of the existing bridge would partially obstruct views from the south of the bridge. The design of the bridge would have minimal vertical elements, other than poles and overhead wires, that would conflict with the views of the truss and the visual features of the existing bridge would not be substantially diminished. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to scenic views of the Old Pacific Electric Santa Ana River Bridge.

With either Streetcar Alternative 1 or 2, the Santa Ana River Trail would continue to be visible from multiple view points and would not be obstructed by the new bridge. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to scenic views of the Santa Ana River Trail.

Streetcar Alternatives 1 and 2 would not diminish the existing moderate low to moderate visual quality of Visual Character Area A or result in adverse effects to scenic views.

Visual Character Area B (Segment 1 – Streetcar Alternatives 1 and 2). The visual quality of Visual Character Area B is low to moderate low. The vertical elements (e.g., catenary wires) would not diminish the low to moderate low visual quality of Visual Character Area B. This visual character area would not include a TPSS and there are no scenic views. Streetcar Alternatives 1 and 2 would not result in adverse effects related to visual quality or scenic views in Visual Character Area B.

Visual Character Area C (Segment 2 – Streetcar Alternatives 1 and 2). The visual quality of Visual Character Area C is moderate low to moderate. The vertical elements (e.g., catenary wires) would not diminish the moderate low to moderate visual quality of Visual Character Area C and there are no scenic views. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to visual quality or scenic views in Visual Character Area C.

Visual Character Area D (Segment 3A – Streetcar Alternative 1). The visual quality of Visual Character Area D is moderate. In addition to the common vertical elements, Visual Character Area D includes Sasser Park and the Downtown Santa Ana Historic District.

Figures 3.6-8 and 3.6-9 demonstrates that views to and from Sasser Park would not be significantly changed or adversely affected by the presence of the streetcars. Sasser Park is located in a highly urban setting, amidst busy roadways and low- to mid-rise buildings. The

addition of streetcars and vertical elements associated with their operation (e.g., catenary wires and light poles) would not diminish the urban setting of the park.

Streetcar Alternatives 1 and 2 alignments travel through the Downtown Santa Ana Historic District. **Figure 3.6-10** shows existing and simulated views of the 4th Street/Sycamore Street intersection, which is within the Downtown Santa Ana Historic District. Operational activity would not disrupt the essential form or integrity of the historic district. Project improvements would not change or remove significant features associated with the historic district. Furthermore, the addition of the streetcars, catenary wires, and light poles within the districts would be a minor change when considering the existing traffic and built-up environment of the Study Area.

This visual character area would not include a TPSS and there are no scenic views. As described above, project elements would not diminish the moderate visual quality of the Visual Character Area D. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to visual quality or scenic views in Visual Character Area D.

Visual Character Area E (Segment 3A – Streetcar Alternative 1). The visual quality of Visual Character Area E is low to moderate low. The area includes the Downtown Santa Ana Historic District and numerous buildings that are contributors to the historic district. As described above, Streetcar Alternatives 1 and 2 would not disrupt the essential form or integrity of the historic district. The vertical elements (e.g., catenary wires) would not diminish the low to moderate low visual quality of Visual Character Area E and there are no scenic views. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to visual quality or scenic views in Visual Character Area E.

Visual Character Area F (Segment 3A – Streetcar Alternative 1). The visual quality of Visual Character Area F is low to moderate low. The vertical elements (e.g., catenary wires) would not diminish the low to moderate low visual quality of Visual Character Area F and there are no scenic views. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to visual quality or scenic views in Visual Character Area F.

Visual Character Area G (Segment 3A – Streetcar Alternative 1). The visual quality of Visual Character Area G is low to moderate. SARTC, which is already used for multiple forms of transportation, would not be adversely affected by the presence of the streetcars moving along Santiago Street. The main visual focus of SARTC is the tower in the center of the facility that would rise substantially above the height of the streetcars. The vertical elements (e.g., catenary wires) would not diminish the low to moderate visual quality of Visual Character Area G and there are no scenic views. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to visual quality or scenic views in Visual Character Area G.



Streetcar Alignment - View through Sasser Park (View South)



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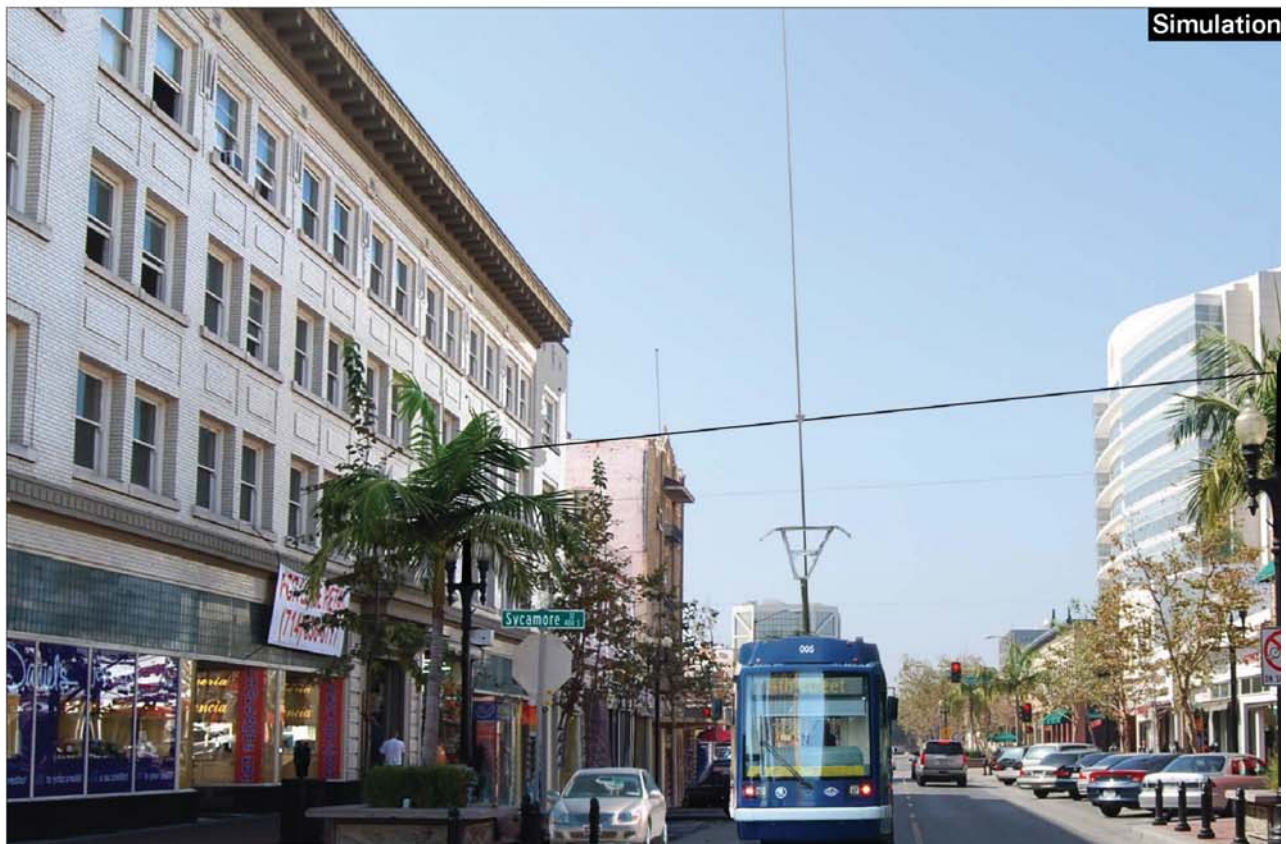
Streetcar Alignment - View through Sascer Park (View West)



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4th Street and Sycamore Street



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Visual Character Area H (Segment 3B – Streetcar Alternative 2). The visual quality of Visual Character Area H is moderate. Visual Character Area H includes Sasser Park. As discussed above, the addition of streetcars and vertical elements associated with their operation (e.g., catenary wires and light poles) would not diminish the urban setting of the park. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to visual quality or scenic views in Visual Character Area H.

Visual Character Area I (Segment 3B – Streetcar Alternative 2). The visual quality of Visual Character Area I is low moderate. The area includes the French Park and Downtown Historic Districts. As described above, Streetcar Alternatives 1 and 2 would not disrupt the essential form or integrity of the historic districts. The vertical elements (e.g., catenary wires) would not diminish the low moderate visual quality of Visual Character Area I and there are no scenic views. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to visual quality or scenic views in Visual Character Area I.

Visual Character Area J (Segment 3B – Streetcar Alternative 2). The visual quality of Visual Character Area J is low to moderate. The area includes SARTC and, as discussed above, Streetcar Alternatives 1 and 2 would not affect the visual quality of SARTC. The vertical elements (e.g., catenary wires) would not diminish the low to moderate visual quality of Visual Character Area J and there are no scenic views. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to visual quality or scenic views in Visual Character Area J.

O & M Facility Sites A and B. O & M Facility Sites A and B would be located in what are characterized as industrial locations. O & M Facility Site A is currently used as a recycling center. O & M Facility Site B is comprised of industrial uses (All Car Auto Parts, SA Scrap Metal Recycling, and American Auto Wrecking) and contains heavy equipment, freight cars, metal scraps, piles of used/abandoned vehicles and vehicle parts. The construction of the O & M Facility at either of these locations would likely improve the visual quality of either site since the site would be cleared of unsightly materials and equipment and replaced with a new facility that would be required as a Best Management Practice (BMP) and a standard City of Santa Ana operation for City-owned facilities to maintain a clean environment. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to visual quality or scenic views associated with O & M Facility Sites A and B.

Light and Glare

The geographic context for both light and glare impacts is site-specific and consists of (1) the lighting associated with O & M Facility Sites A and B and (2) the lighting associated with the proposed station locations. Figures 3.6-2 and 3.6-4 demonstrate the typical lighting systems associated with these project components. To minimize the impacts of project-related lighting, stringent lighting standards will be incorporated into the proposed project during the final design phase and upon project operation.

While the lighting design, including intensity and height, has not been determined to date, in general, the lighting will be designed to direct lighting to the immediate area to minimize

spillover, and will be consistent with the existing lighting in the area. However, it is possible that lighting associated with O & M Facility Site B, located on 5th Street between English Street and Daisy Avenue (adjacent to a residential area), and the lighting associated with stations/platforms located adjacent to residential neighborhoods (e.g., the stations located on Santa Ana Boulevard east and west of the intersection with Bristol Street) could create a new source of lighting that might impact nighttime views in those areas.

Two project design features are included as part of the project description to eliminate adverse light and glare. During the final design process, all lighting fixtures will be architecturally integrated with the character of the surrounding environment. Uniformity or compatibility of lighting type (i.e., height, wattage, energy efficiency, base support, finish material, texture, color and style of poles and luminaires) will be provided, where appropriate. In addition, freestanding light poles and luminaires will not exceed a maximum height of 18 feet. All approved lighting will be energy-efficient, and shielded or recessed so that direct glare and reflections are confined to the maximum extent feasible within the boundaries of the site, and will be directed downward and away from adjoining properties and public right-of-way. The City will ensure that permanently installed lighting will not blink, flash, or be of unusually high intensity or brightness. Landscaping and pedestrian walkway lights will be low-profile. Timers will be used to turn off lights during hours when they are not needed, where acceptable. Project plans will be reviewed and approved by City Staff for compliance with these features prior to the issuance of building permits. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to light and glare.

3.6.2.4 IOS-1 and IOS-2

Adverse effects from the implementation of IOS-1 and IOS-2 would be similar to those identified for Streetcar Alternatives 1 and 2 with the exception of the Old Pacific Electric Santa Ana River Bridge and the Santa Ana River Trail. These resources are not included in IOS-1 and IOS-2. Thus, no changes to the Old Pacific Electric Santa Ana River Bridge or views of and from the Santa Ana River Trail would occur under IOS-1 or IOS-2. It is possible that lighting associated with O & M Facility Site B, located on 5th Street between English Street and Daisy Avenue (adjacent to a residential area), and the lighting associated with stations/platforms located adjacent to residential neighborhoods (e.g., the stations located on Santa Ana Boulevard east and west of the intersection with Bristol Street) could create a new source of lighting that might impact nighttime views in those areas. However, project design features would eliminate potential adverse effects. Therefore, IOS-1 and IOS-2 would not result in adverse effects related to visual quality.

3.6.3 Measures to Minimize Harm

Operational effects related to visual effects would not be adverse. No measures to minimize harm are necessary.

3.6.4 CEQA Determination

3.6.4.1 Significance Criteria and Significance Criteria Application

In accordance with Appendix G of the State CEQA Guidelines, the proposed project would have a significant impact related to visual quality impact if it would:

- Have a substantial adverse effect on a scenic vista;
- Substantially damage a scenic resource, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway;
- Substantially degrade the existing visual character or quality of the site and its surroundings; and/or
- Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.

No Build Alternative

As discussed in Section 3.6.2.1 above, the streetcar would not operate under the No Build Alternative, and consequently, there would not be related effects on visual quality, including scenic vistas, scenic resources, visual character of the Study Area or surrounding communities, and light and glare. Therefore, the No Build Alternative would result in less-than-significant impacts related to visual quality, including scenic vistas, scenic resources, the visual character of the Study Area or surrounding communities, and light and glare.

TSM Alternative

As discussed in Section 3.6.2.2 above, the TSM Alternative would not involve improvements that would significantly impact a scenic vista, scenic resource, or aesthetic features or substantially degrade the existing visual character or quality of the Study Area. Impacts associated with light and glare would be dependent on the details of a specific project. Therefore, the TSM Alternative would result in less-than-significant impacts related to visual quality, including scenic vistas, scenic resources, the visual character of the Study Area or surrounding communities, and light and glare.

Streetcar Alternatives 1 and 2

Scenic Vistas and Resources. As discussed in Section 3.6.2.3 above, Streetcar Alternatives 1 and 2 would result in the installation of overhead contact wire poles with catenary wires, new light poles, and additional traffic signals along the entire length of the proposed project alignment. These project components would introduce new vertical elements to the PE ROW and Santa Ana Boulevard. Workers and patrons of commercial establishments, motorists, and pedestrians would have limited views of the proposed improvements as they move through the area or visit commercial facilities. As previously discussed, Streetcar Alternatives 1 and 2 would not result in significant impacts related to visual quality, particularly that associated with the Old Pacific Electric Santa Ana River Bridge, Santa Ana River Trail, Sasser Park, the French Park and Downtown Santa Ana Historic Districts, and SARTC. Therefore, Streetcar Alternatives 1 and 2 would not have a significant effect on a scenic vista or substantially damage a scenic resource, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway.

Existing Visual Character. As discussed in Section 3.6.2.3 above includes a detailed discussion of the existing visual character of the Study Area and associated visual quality. It was determined that the proposed vertical elements and TPSS would not impact the low to moderate visual quality of the Study Area. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to visual character.

Light and Glare. As discussed in Section 3.6.2.3 above, while the lighting design, including intensity and height, has not been determined to date, in general, the lighting will be designed to direct lighting to the immediate area to minimize spillover, and will be consistent with the existing lighting in the area. However, it is possible that lighting associated with O & M Facility Site B and the stations/platforms located adjacent to residential neighborhoods could create a new source of lighting that might impact nighttime views in those areas. Project design features identified in Section 3.6.2.3 above, would eliminate potential light and glare impacts.

IOS Alternatives 1 and 2

Visual quality impacts from the implementation of IOS-1 and IOS-2 would be similar to those identified for Streetcar Alternatives 1 and 2 with the exception of the Old Pacific Electric Santa Ana River Bridge and the Santa Ana River Trail. These resources are not included in IOS-1 and IOS-2. Thus, no changes to the views of Old Pacific Electric Santa Ana River Bridge would occur under IOS-1 or IOS-2. Lighting associated with O & M Facility Site B and the stations/platforms located adjacent to residential neighborhoods could create a new source of lighting that might impact nighttime views in those areas. However, IOS-1 and IOS-2 would include project design features identified in Section 3.6.2.3 above, which would eliminate potential adverse effects. Therefore, IOS-1 and IOS-2 would not result in significant impacts related to visual quality.

3.6.4.2 Significance After Mitigation

Impacts related to visual quality were determined to be less than significant. No mitigation measures are required.

3.7 Cultural Resources

This section provides an overview of cultural resources and was prepared utilizing the Cultural Resource Evaluation Report included as Appendix F. The analysis is based on the affected environment and project features, and evaluates operational impacts associated with the proposed project.

3.7.1 Affected Environment

The measures used to assess historic and archaeological resources are carried out through the Section 106 process of the National Historic Preservation Act as detailed in 36 CFR 800.5. It is stated that adverse effects occur when an undertaking may directly or indirectly alter characteristics of a historic property that qualify it for inclusion in the NRHP. The assessment also needs to consider reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative.

In order to establish an evaluative historic context, research was conducted at numerous repositories and through a range of primary and secondary sources. Research was conducted through the Santa Ana Public Library, Santa Ana Historic Preservation Society, City of Santa Ana, City of Garden Grove, Orange County Tax Assessor, Electric Railway Historical Association of Southern California, FTA, Caltrans, and various online resources. In addition, researchers obtained historic-period topographic maps, Sanborn Fire Insurance Maps, and aerial photographs were reviewed. In addition, discussions were held with the FTA, the Cities of Santa Ana and Garden Grove, and the OCTA. As a result of this research, an APE was established in accordance with 36 CFR Part 800.16 (d) to ensure identification of significant architectural history and archaeological resources that may be directly or indirectly affected by the proposed project and are listed in or eligible for inclusion in the NRHP and/or California Register of Historical Resources (CRHR).

As defined in 36 CFR 800.16 (d), the APE consists of “the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties.” The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking”. On October 10, 2011, FTA sent SHPO a letter requesting concurrence with the proposed APE. The letter indicated that SHPO concurrence would be assumed unless SHPO provided comments to the contrary to FTA within 30 days. Given that no comments were received from SHPO within that time period, SHPO concurrence with the APE was assumed. It should be noted that, in a subsequent meeting with representatives from the City of Santa Ana and its environmental consultant on December 6, 2011, Amanda Blosser of SHPO provided verbal confirmation that SHPO did, indeed, concur with the APE. Coordination with SHPO continued after the identification of the APE and resulted in a letter concurrence of no adverse effect dated April 7, 2014. This satisfied the responsibilities required under Section 106.

For archaeological and paleontological resources, the proposed direct APE includes the proposed at-grade and underground right-of-way or areas of direct ground disturbance. The direct APE also includes areas with permanent site improvements and areas for staging and temporary construction activities. In order to anticipate effects that may result from both above-ground construction and implementation and subterranean construction and implementation, the proposed vertical APE extends from approximately the existing ground surface to 25 feet above the existing ground surface and approximately 80 feet below the existing ground surface. Refer to the Cultural Resource Evaluation Report in Appendix F for a map of the APE.

As shown in **Table 3.7-1** and **Figure 3.7-1**, 68 cultural resources in the APE were recorded and evaluated for eligibility for listing to the NRHP and CRHR. Forty-five of these 68 resources were determined to be eligible for listing to the NRHP and 53 of these 68 resources were determined to be eligible for the CRHR. Twelve properties were individually eligible for the NRHP. Five of these 12 properties were contributors to a historical district. Thirty-nine of these properties were contributors to a historical district, all but one of which were determined to be eligible for the NRHP. There are two NRHP districts within the

APE, the Downtown Historic District and the French Park Historic District. Contributing buildings to the historic districts are designated by C-NR in Table 3.7-1.

A search was also completed to identify Native American resources. Research of the Native American Heritage Commission Sacred Lands File identified Native American cultural resources within the Newport Beach U.S. Geological Survey 7.5-Minute Series Quadrangle. Additionally, the Lead Agency sent notices to 15 Native American individuals and organizations. The Juaneño Band of Mission Indians stated that they consider the Study Area to be tribal sacred lands.

Regarding paleontological resources (See Appendix G), the Natural History Museum of Los Angeles County records indicate that the APE does not have vertebrate fossil localities but there are localities nearby from the same sedimentary units that occur as subsurface deposits. The APE is comprised of younger terrestrial Quaternary Alluvium derived from the Santa Ana River floodplain that extends through the western portion of the APE, with older terrestrial Quaternary sediments occurring at various depths. The younger Quaternary deposits typically do not contain significant vertebrate fossils, at least in the uppermost layers, but a vertebrate fossil locality adjacent to portions of the APE east and west of the Santa Ana River produced fossil specimen at depths of less than ten feet.

3.7.2 Environmental Consequences

3.7.2.1 No Build Alternative

The No Build Alternative includes existing conditions within the Study Area and adds future planned and funded transit and roadway improvement projects. Each of these future projects will be environmentally cleared through separate project-specific environmental documentation. The streetcar would not operate under this alternative and there would not be related effects to cultural resources. Therefore, the No Build Alternative would not result in adverse effects related to cultural resources.

TABLE 3.7-1: CULTURAL RESOURCES WITHIN THE APE

Map Ref. No.	Address	Resource Name / Historic Relevance	SHPO Status Code	NRHP-Eligible/Criteria	Other Identifier
1	12022 Quatro Ave.	Ranch style single-family residence	6Z	No	176912
2	1424 N. Susan St.	Quonset Huts	3S	Yes, C	N/A
3	Old Pacific Electric Santa Ana River Bridge	Pegram Truss style bridge	2S2	Yes, A	161847
4	2415 W. 5 th St.	Automotive Core Supplier Vernacular industrial building	6Z	No	177031
5	2216 W. 5 th St.	Sarinana's Market Tamale Factory	6Z	No	177028
6	2110 W. 5 th St.	Craftsman Bungalow-style single-family residence	6Z	No	177029
7	2106 W. 5 th St.	Carnitas Uruapan/San Juan Market - Vernacular commercial building	6Z	No	177030
8	2016-2020 W. 5 th St.	6 single-family houses -Vernacular building originally a grocery store e	6Z	No	177032
9	1804 W. 5 th St.	Foreign Wrecks West –originally a major employer as a lumber and investment company	6Z	No	177033
10	1802 W. 4 th St.	Vernacular commercial/industrial building	6Z	No	177034
11	1302 W. Santa Ana Blvd. /a/	Bristol Drug Co. – Art Moderne two-part commercial block building	3S	Yes, C	176992
12	414 W. 4 th St.	Telacu (Parsons Market Building) - 20 th Century two-part commercial block building	1D, 5S1	Yes, A	C-NR 84000438, SARHP 189
13	412 W. 4 th St.	Nicholas Academic Center (Parsons apartment building) -20 th Century two-part commercial block building	1D, 5S1	Yes, A	C-NR 84000438, SARHP 190
14	408 W. 4 th St.	Clausen-Block, Pastrami Deli - 20 th Century two-part commercial block building	5S1	No	C-NR 84000438, SARHP 140
15	404 and 406 W. 4 th St.	Lawrence commercial building - 20 th Century two-part commercial block building	1D, 5S1	Yes, A	C-NR 84000438, SARHP 174
16	400 and 402 W. 4 th St.	Bistro (Company L. Armory) - 20 th Century two-part commercial block building	1D, 5S1	Yes, A	C-NR 84000438, SARHP 179
17	324 A and B W. 4 th St.	West End Theater – Italian Renaissance building	1D, 5S1	Yes, A	C-NR 84000438, SARHP 218
18	312, 314, and 316 W. 4 th St.	Casa De Empeno (Semi-Tropic Hotel) - 20 th Century two-part commercial block building	1D, 5S1	Yes, A	C-NR 84000438, SARHP 243
19	310 W. 4 th St.	Abogados (Bon Ton Bakery) – Mid-Century Modern building	1D, 5S1	Yes, A	C-NR 84000438, SARHP 237
20	302, 304, 306, and 308 W. 4 th St.	The Peggy Shop (Gilmaker Block) - 20 th Century one-part commercial block building	5S1	No	NC-NR 84000438, SARHP 244

TABLE 3.7-1: CULTURAL RESOURCES WITHIN THE APE

Map Ref. No.	Address	Resource Name / Historic Relevance	SHPO Status Code	NRHP-Eligible/Criteria	Other Identifier
21	222 W. 4 th St.	Cenesis Bridal Shop (Moore Building) – Mission Revival	1D, 5S1	Yes, A	C-NR 84000438, SARHP 182
22	220 W. 4 th St.	Hispano-American Jewelers (Ed Waites Saloon & Billiard Hall) - one-part commercial block building	6Z	No	NC-NR 84000438
23	214, 216, and 218 W. 4 th St.	Bridal Shop (Riverine Block) - two-part commercial block building	1D, 5S1	Yes, A	C-NR 84000438, SARHP 152
24	202, 204, 206, 208 210, and 212 W. 4 th St.	W.H. Spurgeon Building - 20th Century two-part commercial block building	1D, 1S, 1CS, 5S1	Yes, A	C-NR 84000438, SARHP 20; NRIS 79000516; CPHI 487
25	301-309 W. 4 th St.	Starbucks (Phillips Block) - two-part commercial block building	1D, 5S1	Yes, A	C-NR 84000438, SARHP 11
26	221 and 223 W. 4 th St.	Teresa’s Jewelers (Been Block/Fashion Saloon) - two-part commercial block building	1D, 5S1	Yes, A	C-NR 84000438, NC-NR 84000438, SARHP 153
27	219 W. 4 th St.	Cassandra’s Bridal (Crabtree Saloon) – Vernacular commercial building	5S1	No	NC-NR 84000438, SARHP 144
28	213, 215, and 217 W. 4 th St.	Elia’s Bridal, Epocca, and Joshua’s Designs - 20th Century one-part commercial block building	1D, 5S1	Yes, A	C-NR 84000438, SARHP 160
29	209 and 211 W. 4 th St.	Fiesta Juice (Semi-Tropic #2) – Victorian commercial building	1D, 5S1	Yes, A	C-NR 84000438, SARHP 198
30	407, 409, and 411 N. Broadway	Las Brisas Restaurant (Beem Building, J.J. Wilson’s Shoeshine Parlor) – Spanish Colonial Revival	1D, 5S1	Yes, A	C-NR 84000438, SARHP 175
31	203 and 205 W. Civic Center Drive	YMCA – Community Center/Social Hall	1S, 5S1	Yes, A	NRIS 93000237, SARHP 6
32	211 W. Santa Ana Blvd.	Old Orange County Courthouse – Richardsonian Romanesque	1D, 1S, 1CL, 5S1	Yes, A	C-NR 84000438, NRIS 77000321, CHL 837, SARHP 1
33	120 E. Civic Center Drive	Dr. Howe-Waffle House – Queen Anne	1D, 1S, 1CS, 5S1	Yes, A	C-NR 84000438, NRIS 77000320, CHPI P341, SARHP 2
34	600 N. Main St.	First Presbyterian Church – Gothic Revival	3S	Yes, C	N/A
35	618-624 Main St.	World Travel (Dr. Wehrly Medical) - 20th Century two-part commercial block building	1D	Yes, A	C-NR 84000438
36	120 W. 4 th St.	Don Roberto Jewelers - 20th Century two-part commercial block building	6Z	No	NC-NR 84000438

TABLE 3.7-1: CULTURAL RESOURCES WITHIN THE APE

Map Ref. No.	Address	Resource Name / Historic Relevance	SHPO Status Code	NRHP-Eligible/Criteria	Other Identifier
37	116 W. 4 th St.	Valencia Jewelry MFG (Orange County Savings & Trust) – Classic Revival	1D, 5S1	Yes, A	C-NR 84000438, SARHP 186
38	108, 110, 112, and 114 W. 4 th St.	Foto Fiesta, Pasarela Bridal, La Moda, Mo’s Perfume (Titchenal Block/Santa Ana Hardware Company) – Classic Revival	1D, 5S1	Yes, A	C-NR 84000438 SARHP 197 SARHP 155 SARHP 164
39	102 and 106 W. 4 th St.	Bank of America (First National Bank Building) – Beaux Arts	1D, 5S1	Yes, A	C-NR 84000438, SARHP 234
40	102 E. 4 th St.	Dental, Tax Office (Dibble Building) - 20th Century two-part commercial block building	1D, 5S1	Yes, A	C-NR 84000438, SARHP 245
41	104 and 106 E. 4 th St.	Rhodes Jewelry & Loan, Rancho D Mendoza (Dragon Confectionary) – Art Deco	1D, 5S1	Yes, A	C-NR 84000438, SARHP 238
42	108, 110, and 112 E. 4 th St.	Clothing Retail Stores (Shaffer-Wakeham Building) – Art Deco	1D, 5S1	Yes, A	C-NR 84000438, SARHP 246
43	114 E. 4 th St.	Belinda’s Photo Y Video (George Edgar Block) - 20th Century two-part commercial block building	1D	Yes, A	C-NR 84000438
44	116 E. 4 th St.	Bandolero (Brunner Building) – ZigZagModerne	1D, 5S1	Yes, A	C-NR 84000438, SARHP 239
45	118 E. 4 th St.	HarbyKryhal – Neoclassical	1D, 5S1	Yes, A	C-NR 84000438, SARHP 247
46	120 E. 4 th St.	La Moda Clothing Retail (California Commercial Block) – Neoclassical	1D	Yes, A	C-NR 84000438
47	202, 204, 206, 208, and 210 E. 4 th St.	Patty’s Bridal, Brian’s La Paloma El Paso Shoe Store (Hervey-Finley Building) - 20th Century two-part commercial block building	1D, 5S1	Yes, A	C-NR 84000438, SARHP 256
48	312, 314, and 316 E. 4 th St.	Charlie’s Boots (Semi-Tropic #1) - one-part commercial block building	5S1	No	NC-NR 84000438, SARHP 254
49	318 and 320 E. 4 th St.	Barber (Mussleman Block) - 20th one and two-part commercial block building	5S1	No	SARHP 255
50	400-412 E. 4 th St.	Mega Furniture Superstore (Hotel Finley) - two-part commercial block building	5S1	No	SARHP 30
51	117 W. 4 th St.	The Rankin Building – three-part commercial block	1D, 1S, 5S1	Yes, A	C-NR 84000438, SARHP 192
52	115 W. 4 th St.	Dollar Express (Home Mutual and Loan) - two-part commercial block building	6Z	No	NC-NR 84000438
53	113 W. 4 th St.	Mina Bridal (Tinkers Jewelry) - two-part commercial block building	1D, 5S1	Yes, A	C-NR 84000438, SARHP 236
54	109 W. 4 th St.	Colleen O’Hara’s Beauty Academy (Pedrini’s) - two-part commercial block building	6Z	No	NC-NR 84000438
55	101 W. 4 th St.	Wells Fargo (Otis Building) - two-part commercial	1D, 5S1	Yes, A	C-NR 84000438,

TABLE 3.7-1: CULTURAL RESOURCES WITHIN THE APE

Map Ref. No.	Address	Resource Name / Historic Relevance	SHPO Status Code	NRHP-Eligible/Criteria	Other Identifier
		block building			SARHP 187
56	118 and 120 W. 5 th St.	Ramona Building – 20th Century two-part commercial block building	1D, 5S1	Yes, A	C-NR 84000438, SARHP 191
57	501 E. 5 th St.	Single-family (Whitson-Powelson House) – Queen Anne	5S1	No	SARHP 29
58	507 N. Minter	Multi-family – Folk Victorian	3S	Yes, A	N/A
59	5151 N. Main St.	Commercial Building (McFadden Public Market) - Spanish Colonial Revival	1D, 5S1	Yes, A	C-NR 84000438, SARHP 178
60	517 and 519 N. Main St.	Horton Furniture (JC Horton) – Art Deco	1D, 5S1	Yes, A	C-NR 84000438, SARHP 166
61	115 E. Santa Ana Blvd.	United Presbyterian Church – Classical Revival	1D	Yes, A	C-NR 84000438
62	615 N. Bush St.	AW Mellon (U.S. Post Office Spurgeon Station) – Spanish Colonial Revival	1D	Yes, A	C-NR 84000438
63	614 N. Bush St.	Church of the Messiah – English Gothic	1D, 1CS, 5S1	Yes, A	C-NR 84000438, CHPI P515, SARHP 251
64	624 French	First United Methodist Church – Tudor Revival	3S	Yes, C	N/A
65	607 E. Santa Ana Blvd.	Commercial Building (405-407 Fruit Street) – one-part commercial block	6Z	No	179882
66	611 E. Santa Ana Blvd.	Multi-family (411-413 Fruit Street) – Craftsman	6Z	No	161037
67	621 N. Spurgeon	Single-family (Thomas House) – Queen Anne	5S1	No	SARHP 26
68	Portion of Burlington Northern Santa Fe Railway	BNSF Railway (Atchinson, Topeka, and Santa Fe Railway)	6Z	No	176663

Notes:

Shaded rows are new properties found eligible for listing in the National Register through current survey and evaluation documented in the Cultural Resources Technical Report.

The eligibility of the shaded properties is assumed for the purposes of this undertaking as directed by SHPO.

C-NR = Contributor to a NRHP district

NC-NR = Noncontributor to a NRHP district

SARHP = Santa Ana Register of Historical Properties

1D = Listed in National Register as a Contributor to a district or multi resource property.

2S2 = Det. eligible for separate listing by a consensus determination

6Z = Found ineligible for National Register.

5S1 = Eligible for Local Listing only-listed or eligible separately under Local Ordinance.

3S = Appears eligible for listing in National Register as a separate property.

N/A = Not Applicable

NRHP Criteria

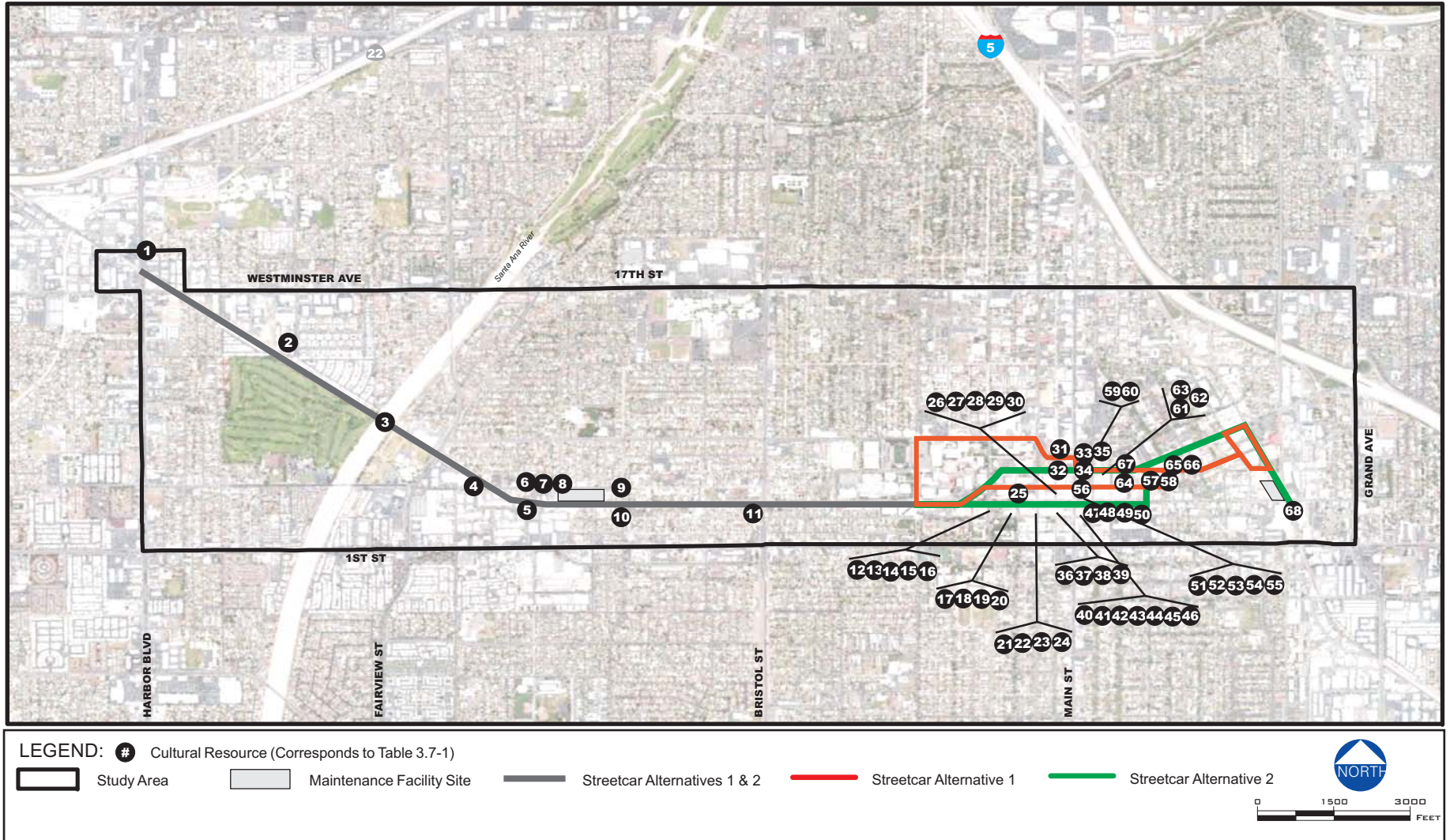
A. Associated with events that have made a significant contribution to the broad patterns of our history

B. Associated with the lives of persons significant in our past

TABLE 3.7-1: CULTURAL RESOURCES WITHIN THE APE

Map Ref. No.	Address	Resource Name / Historic Relevance	SHPO Status Code	NRHP- Eligible/Criteria	Other Identifier
<p>C. Embody distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction</p> <p>D. Have yielded, or may be likely to yield, information important in prehistory or history</p> <p>/a/ Building is no longer at site</p> <p>Source: URS Corporation, updated by Terry A. Hayes Associates Inc, Cultural Resource Evaluation Technical Report, December 2013</p> <p>.</p>					

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Source: Terry A. Hayes Associates Inc., August 2012.

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3.7.2.2 TSM Alternative

The TSM Alternative emphasizes low-cost improvements and operational efficiencies, such as focused traffic engineering actions, expanded bus service, and improved access to transit services. It may include some minor physical enhancements, such as improvements to transit stop amenities (e.g., bus benches). These minor improvements would have no or negligible impacts to cultural resources. Therefore, the TSM Alternative would not result in adverse effects related to cultural resources.

3.7.2.3 Streetcar Alternatives 1 and 2

Research and field surveys were completed to identify archaeological, paleontological, and historic properties in the APE. No archaeological resources were identified as eligible for listing to the NRHP and CRHR. There are 45 historic properties eligible for the NRHP identified in Table 3.7-1, above.

Streetcar Alternatives 1 and 2 would be located within a densely developed urban environment that features numerous non-historic period elements and rail transit in the APE has a historic precedent. The changes within the urban environment within the APE have affected the general setting, feeling and character, including the areas near the two historic districts, the Downtown Santa Ana and French Park Historic Districts. Streetcar Alternatives 1 and 2 would not create a false sense of history or historical appearance near these historic districts and would not introduce non-compatible visual elements that contrast with the scale, design, and character of the APE. The streetcar system would be minor change when considering the existing traffic and built-up environment of the area. The operation of the streetcar system would not alter the use or character-defining features of historic properties, and would be in scale with the surrounding development within the APE. Operational activity would not disrupt the essential form or integrity of the environment, and would not be a visual, audible, or atmospheric intrusion. Therefore, of the 45 NRHP-eligible properties within the APE, 44 would result in no adverse effects related to cultural resources from the proposed undertaking. The remaining historic property, is discussed below.

One historic-period property, the Old Pacific Electric Santa Ana River Bridge, could be affected by the proposed project. The existing bridge would remain in place and a new bridge would be constructed adjacent to the south of the existing historic bridge. The proposed project would require the alignment to be grade separated from the Santa Ana River Trail on both the east and west sides of the river. This would require an alteration to the west abutment of the Old Pacific Electric Santa Ana River Bridge to allow the trails to be separated. The abutment of the bridge is not an original component of the bridge and is not an element or feature that contributes to the historic quality of the bridge. The existing bridge height and widths would not change; however, the visual elements of the bridge would be affected because the materials used for the new parallel structures would differ from the historic materials.

The feature that qualifies the bridge as a resource, the Pegram Truss, is defined by its features of a distinguishable geometric design, with the posts arranged at increasing angles from the vertical chords from the center of the truss towards the ends. These features are

most distinguishable at the top of the bridge span. Because the views of the existing bridge would only be partially obstructed at the base of the bridge and to a limited group of viewers, the adjacent single-track bridge would not substantially impair the bridge's activities, or view of the Pegram Truss architecture. The new adjacent bridge would not substantially diminish or impair the historic features or setting of the existing bridge and no adverse effects would occur.

Vibration from the new bridge can only be transmitted through points of contact between the new bridge and the existing bridge. Vibration from the new concrete bridge would need to travel down the support columns, into the bridge foundation and essentially vibrate the ground and the concrete channel lining. Those vibrations would then need to be transmitted up the existing bridge support/pier to the existing bridge truss. In general, concrete is not good at transmitting vibrations because it generally is in a cracked condition (it is not a homogeneous material like steel) that tends to damp out/mute vibrations. The likelihood of vibration from a streetcar traveling over the new concrete bridge and causing significant damage to the existing adjacent bridge would be very low. During final design, a qualified structural engineer would survey the existing foundation and other structural aspects of the Pacific Electric Santa Ana Railroad Bridge and provide measures to protect the historic bridge from potential vibration damage. Therefore, vibration from streetcar operations would not result in an adverse effect to the Old Pacific Electric Santa Ana River Bridge.

In summary, FTA has determined that the construction and operation of the proposed undertaking would result in no adverse effect on historic properties, including the Old Pacific Electric Santa Ana River Bridge. SHPO, in a letter dated April 7, 2014 (Appendix F), has concurred with this determination.

3.7.2.4 IOS-1 and IOS-2

The alignments associated with IOS-1 and IOS-2 would terminate at Raitt Street and Santa Ana Boulevard. Effects from the implementation of IOS-1 and IOS-2 are also similar to those identified for the streetcar alternatives, with the exception of effects to the Old Pacific Electric Santa Ana River Bridge. Under IOS-1 and IOS-2, the bridge would not be affected and associated adverse effects would not occur. Therefore, IOS-1 and IOS-2 would not result in adverse effects related to cultural resources.

3.7.3 Measures to Minimize Harm

Construction and operational effects related to cultural resources would not be adverse for the proposed undertaking. The concurrence on the determination of no adverse effect is included as part of the Section 106 review process. As part of this coordination process, Mitigation Measure CR-1 has been identified in the Construction Section (3.16.2.3) to ensure that effects are not adverse.

3.7.4 CEQA Determination

3.7.4.1 Significance Criteria and Significance Criteria Application

In accordance with Appendix G of the State CEQA Guidelines, the proposed project would have a significant impact related to cultural resources if it would:

- Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5;
- Cause a substantial adverse change in the significance of a unique archaeological resource pursuant to define Section 15064.5;
- Directly or indirectly disturb or destroy a unique paleontological resource or site; and/or
- Disturb any human remains, including those interred outside of formal cemeteries.

No Build Alternative

As discussed in Section 3.7.2.1 above, the streetcar would not operate under the No Build Alternative, and consequently, there would not be related effects on to cultural resources, including historic, archaeological, and paleontological resources and human remains within the APE. Therefore, the No Build Alternative would result in no impacts related to cultural resources, including historic, archaeological and paleontological resources and human remains.

TSM Alternative

As discussed in Section 3.7.2.2 above, the TSM Alternative would not involve improvements that would significantly impact historic, archaeological, and paleontological resources and human remains within the APE. Therefore, the TSM Alternative would result in no impacts related to cultural resources, including historic, archaeological, and paleontological resources and human remains.

Streetcar Alternatives 1 and 2

Historical Resources. As discussed in Section 3.7.2.3 above, Streetcar Alternatives 1 and 2 would not result in adverse effects to significant historic properties indentified within the APE. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to historical resources.

Archaeological Resources. As discussed in Section 3.7.2.3 above, no archaeological resources were identified as eligible for listing to the NRHP and CRHR. Therefore, Streetcar Alternatives 1 and 2 would result in no impacts on archeological resources.

Paleontological Resources. It is not anticipated that operations of the surface-based streetcar system would uncover paleontological resources. Therefore, Streetcar Alternatives 1 and 2 would result in no impacts related to paleontological resources.

Human Remains. It is not anticipated that operations of the surface-based streetcar system would uncover human remains. Therefore, Streetcar Alternatives 1 and 2 would result in no impacts related to human remains.

IOS-1 and IOS-2

Cultural Resources impacts from the implementation of IOS-1 and IOS-2 would be similar to those identified for Streetcar Alternatives 1 and 2 with the exception of the Old Pacific Electric Santa Ana River Bridge. This resource is not included in IOS-1 and IOS-2. Thus, no changes to the Old Pacific Electric Santa Ana River Bridge would occur under IOS-1 or IOS-2. Therefore, IOS-1 and IOS-2 would result in no impacts related to historic, archaeological, and paleontological resources.

3.7.4.2 Significance After Mitigation

Impacts related to cultural resources were determined to be less than significant. No mitigation measures are required.

3.8 Geology, Soils, and Seismicity

This section provides an overview of geology, soils, and seismicity and was prepared utilizing the Paleontological Technical Memorandum included as Appendix G. The analysis is based on the affected environment and project features, and evaluates operational impacts associated with the proposed project.

3.8.1 Affected Environment

The Study Area is located in the Los Angeles Basin geologic region. The Los Angeles Basin is a northwest-trending, alluvium lowland plain that is approximately 50 miles long and 20 miles wide. The Study Area lies on a wide mesa west of the Santa Ana Mountains and north of the San Joaquin Hills within the southern margin of the Orange County coastal plain. The mesa is underlain by alluvial and fluvial deposits from the Santa Ana River system, consisting predominantly of gravel, sand, and silt. The Santa Ana River crossing area is underlain mostly by late wash deposits consisting of unconsolidated boulder to sandy alluvium. It is anticipated that some of the underlying material within the Study Area will have some clay-bearing soil horizons and localized artificial fill comprised of native alluvial soils.

The Study Area does not traverse an earthquake fault zone. The nearest active fault zones to the Study Area are the Newport-Inglewood Fault Zone (6 miles southwest), the San Joaquin Hills Thrust (9.5 miles south), the Whittier Elsinore Fault Zone (12 miles to the northeast) and the Puente Hills Blind Thrust (10 to 20 miles north and north-northwest).¹⁵ Based on the U.S. Geological Survey, the calculated maximum magnitude of a seismic event in the Newport Inglewood Fault Zone ranges from 6.5 to 7.2. The probable maximum magnitude for the Whittier Elsinore Fault Zone ranges from 6.8 to 7.5, the San Joaquin Hills Fault Zone ranges from 6.5 to 7.1, and the Puente Hills Blind Thrust Fault Zone ranges from 6.5 to 7.0.

The potential for seismically-induced liquefaction (i.e., a significant and relatively sudden reduction in stiffness and shear strength of saturated sandy soils caused by a seismically-induced increase in pore water pressures) is present whenever relatively loose, sandy soils

¹⁵ California Geological Survey, 2002, *California Fault Parameters*, available: <http://www.consrv.ca.gov/cgs/rghm/psha/Pages/Index.aspx>, accessed: June 2011 and Pratt et al., 2002.

exist with high groundwater levels and are exposed to high-intensity seismic shaking. The depth of groundwater within the Study Area ranges from 5 to 40 feet below ground surface. According to the Seismic Hazard Zone Reports, the depth of groundwater becomes shallower in the western end of the Study Area.¹⁶ A review of the California Geological Survey's Continental Margin Geologic Map in the Seismic Hazard Zones Report for the Anaheim and Newport Beach 7.5-Minute Quadrangles indicates that the western half of the Study Area lies in an area with potential shallow groundwater and is mapped as moderately susceptible to liquefaction during strong ground motions. This area includes a segment of the Streetcar Alternatives 1 and 2 shared alignment between Harbor Boulevard and Raitt Street.

Seismically-induced landslides and other slope failures are common occurrences during or soon after earthquakes. The topography within the Study Area is relatively flat and is not mapped as being in an earthquake-induced landslide zone.¹⁷ The Study Area crosses the Santa Ana River approximately 20 miles downstream of the Prado Dam, and 15 miles downstream of Santiago Creek and Irvine Lake Dam. Additionally, the Study Area traverses the Santa Ana River floodplain within the limits of a 100- and 500-year flood zone. Accordingly, there is potential for flooding from dam inundation or occurrence of a 100- or 500-year flood.

3.8.2 Environmental Consequences

3.8.2.1 No Build Alternative

The No Build Alternative includes existing conditions within the Study Area and adds future planned and funded transit and roadway improvement projects. Each of these future projects will be environmentally cleared through separate project-specific environmental documentation. The streetcar would not operate under this alternative and there would not be related to geologic and seismic hazards impacts. Therefore, the No Build Alternative would not result in adverse effects related to geology, soils, and seismicity.

3.8.2.2 TSM Alternative

The TSM Alternative emphasizes low-cost improvements and operational efficiencies, such as focused traffic engineering actions, expanded bus service, and improved access to transit services. It may include some minor physical enhancements, such as improvements to transit stop amenities (e.g., bus benches). These minor improvements would have no or negligible impacts to geology, soils, and seismicity. In addition, new construction would be required to obtain building permits to comply with seismic safety standards. Therefore, the TSM Alternative would not result in adverse effects related to geology, soils, and seismicity.

¹⁶ California Geological Survey, 1998, *California Geological Survey. Seismic Hazards Zonation Program*. Available: http://gmw.consrv.ca.gov/shmp/html/pdf_maps_so.html, accessed: June 2011.

¹⁷ California Geological Survey, 1998, *California Geological Survey. Seismic Hazards Zonation Program*. Available: http://gmw.consrv.ca.gov/shmp/html/pdf_maps_so.html, accessed: June 2011.

3.8.2.3 Streetcar Alternatives 1 and 2

The difference between Streetcar Alternatives 1 and 2 is the alignment configuration in Downtown Santa Ana commercial area. However, the Study Area has the same geologic and seismic features under all alignment options.

Fault Rupture. The Study Area is not within an earthquake fault zone as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map. There is no known evidence of a fault surface rupture expressed in the regional geomorphology and available historic aerial photographs. Given that there is no mapped earthquake fault zone within seven miles of the Study Area, the potential for fault rupture is low. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to fault rupture.

Seismic Ground Shaking. The subsurface condition of the Study Area is composed mostly of alluvium that could potentially be exposed to strong seismic ground shaking. This ground shaking could damage streetcar tracks, the Santa Ana River Bridge, the Westminster Avenue Bridge, or O & M Facility Site A or B. Regulatory agencies require that the structural integrity of project facilities is maintained under static and seismic loading and operational demands. Examples of relevant design requirements that may be utilized in Streetcar Alternatives 1 and 2 include:

- *Vibrocompaction/Vibroflotation* – A procedure that increases density of loose soils that would otherwise be susceptible to seismic ground shaking, liquefaction, and seismically-induced ground failure.
- *Stone Columns to Support Overhead Bridge* – This procedure, used in conjunction with vibrocompaction/vibroflotation, mitigates risks from liquefaction and seismically-induced ground failure by providing drainage locations and increasing the support strength of the underlying soil.
- *Piles at the Santa Ana River Bridge Structure* – The installation of piles, especially if closely spaced, can reduce the probability of liquefaction of relatively shallow soils.

City Staff and regulatory agencies are required to review the design plans ensure the structure integrity of project facilities. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to seismic ground shaking.

Liquefaction. The Study Area is mostly underlain by alluvial deposits comprised of sand and silt that vary laterally and vertically. The segment of the alignment between Harbor Boulevard and Raitt Street may be impacted by liquefaction due to the potential shallow depth to groundwater within the Study Area of less than 20 feet. The adverse impacts of seismically-induced ground failure could include potential collapse or misalignment of at-grade rails which may cause streetcar derailment. City Staff would review and approved the appropriate foundation treatment prior to the issuance of building permits. As a standard best management practice, all susceptible soils are required to be removed and replaced with engineered fill for structures on shallow foundations. Alternatively, the City may require deep foundations (i.e., driven piles) to be used to stabilize foundations. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to liquefaction.

Landslides. The Study Area is flat with no significant slopes. There is no potential for landslides or seismically-induced landslides. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to landslides.

Seismically-Induced Flooding. Seismically-induced flooding would result from surface rupture or strong ground motions resulting in pipeline or dam failure. However, the distance of the nearest dam structure combined with emergency procedures that address dam failure or flooding would result in a low potential for flooding in the Study Area. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to seismically-induced flooding.

3.8.2.4 IOS-1 and IOS-2

All impacts from the implementation of IOS-1 and IOS-2 are nearly identical to those identified for Streetcar Alternatives 1 and 2. The only difference would be that the PE ROW segment between Harbor Boulevard and Raitt Street, which has been identified as an area with the potential for shallow groundwater and moderate liquefaction, would be eliminated under IOS-1 and IOS-2. Thus, no adverse effects due to seismically-induced ground failure would occur. The potential remains for strong seismic ground shaking that could damage the streetcar tracks or O & M Facility Site A or B. As described above, the structural integrity of project facilities would be maintained under static and seismic loading and operational demands. Therefore, IOS-1 and IOS-2 would not result in adverse effects related to seismic ground shaking.

3.8.3 Measures to Minimize Harm

Operational effects related to geology, soils, and seismicity would not be adverse. No measures to minimize harm are necessary.

3.8.4 CEQA Determination

3.8.4.1 Significance Criteria and Significance Criteria Application

In accordance with Appendix G of the State CEQA Guidelines, the proposed project would have a significant impact related to geology, soils, and seismicity if it would:

- Expose people or structures to potentially substantial adverse effects, including the risk of loss, injury, or death involving:
 - 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
 - Strong seismic ground shaking
 - Seismically-induced ground failure, including liquefaction
 - Landslides;
- Result in substantial soil erosion or loss of top soil;
- Result in the loss of a unique geologic feature;

- Be located on strata 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;
- 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;
- Have soils capable 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;
- Result in the loss of availability of a known mineral resource that would be of value to the region and the residences of the State; and/or
- 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 Build Alternative

As discussed in Section 3.8.2.1 above, the streetcar would not operate under the No Build Alternative, and consequently, there would not be related geologic and seismic hazards effects. Therefore, the No Build Alternative would result in no impacts related to geology, soils, and seismicity.

TSM Alternative

As discussed in Section 3.8.2.2 above, the TSM Alternative would not involve improvements that would have a significant impact related to geologic and seismic hazards. Minor improvements or new construction under the TSM Alternative would be required to obtain building permits to comply with current seismic safety standards. Therefore, the TSM Alternative would result in less-than-significant impacts related to geology, soils, and seismicity.

Streetcar Alternatives 1 and 2

Earthquake Faults and Seismic Hazards. As discussed in Section 3.8.2.3 above, the Study Area is not within an earthquake fault zone as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map. Given that there is no mapped earthquake fault zone, the potential for fault rupture within the Study Area is low. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to fault rupture.

The subsurface condition of the Study Area is composed mostly of alluvium that could potentially be exposed to strong seismic ground shaking. This ground shaking could damage streetcar tracks, the Santa Ana River Bridge, the Westminster Avenue Bridge, or O & M Facility Site A or B. In addition, the segment of the alignment between Harbor Boulevard and Raitt Street may be impacted by liquefaction due to the potential shallow depth to groundwater of less than 20 feet. The impacts of liquefaction could include potential collapse or misalignment of at-grade rails, which may cause streetcar derailment. City Staff and regulatory agencies are required to review the design plans ensure the structure integrity of project facilities. Examples of engineering features that would reduce seismic hazards are described above. In addition, City Staff would review and approved the appropriate foundation treatment prior to the issuance of building permits. Therefore, Streetcar

Alternatives 1 and 2 would result in less-than-significant impacts related to seismic ground shaking and liquefaction.

Seismically-induced landslides and other slope failures are common occurrences during or soon after earthquakes. The topography of the Study Area is relatively flat with no significant slopes and is not mapped as being in an Earthquake-Induced Landslide Zone. There is no potential for landslides or seismically-induced landslides. Therefore, Streetcar Alternatives 1 and 2 would result in no impacts related to landslides.

Soils and Soil Erosion. The entire length of streetcar alignment and the O & M Facility would be completely paved. The Study Area is in a flat, highly urbanized area and there is little potential for soil erosion. Therefore, Streetcar Alternatives 1 and 2 would result in no impacts related to soil erosion.

Expansive soils are typically associated with fine-grained clayey soils that have the potential to shrink and swell with repeated changes in the moisture content. It is not anticipated that expansive soils are located near the surface in the Study Area. Therefore, Streetcar Alternatives 1 and 2 would result in no impacts related to expansive soil.

Unique Geologic Features. The Study Area is in a flat, highly urbanized area without a unique geologic feature. Therefore, Streetcar Alternatives 1 and 2 would result in no impacts related to unique geologic features.

Septic Tanks. The Study Area is located in an urbanized area extensively served by existing sewer infrastructure. Implementation of Streetcar Alternatives 1 and 2 would not require the use of septic tanks nor alternative wastewater disposal systems. Therefore, Streetcar Alternatives 1 and 2 would result in no impacts related to septic tanks.

Mineral Resources. According to the City of Santa Ana General Plan, Land Use Element, as well as the California Geological Survey, the Study Area does not lie within a known mineral resource or mineral hazard area (i.e., radon) that would pose a risk to the human population. The Study Area does not include mineral activity areas regulated by the Surface Mining and Reclamation Act and, according to the State of California Department of Conservation Division of Oil, Gas and Geothermal Resources on-line mapping system, there are no geothermal resources, including oil and gas, located in the Study Area. Therefore, Streetcar Alternatives 1 and 2 would result in no impacts related to mineral resources.

IOS-1 and IOS-2

Geologic and seismic hazard impacts from the implementation of IOS-1 and IOS-2 would be nearly identical to those identified for Streetcar Alternatives 1 and 2, except for the PE ROW segment between Harbor Boulevard and Raitt Street. This segment, which has been identified as an area with potential for shallow groundwater and moderate liquefaction risk, is not included in IOS-1 and IOS-2, and, thus, would eliminate the potential for a significant impact due to seismically-induced ground failure. However, the potential remains for strong seismic ground shaking that could damage the streetcar tracks or O & M Facility Site A or B.

As described above, the structural integrity of project facilities would be maintained under static and seismic loading and operational demands. Therefore, IOS-1 and IOS-2 would result in less-than-significant impacts related to seismic ground shaking and liquefaction.

3.8.4.2 Significance After Mitigation

Impacts related to geologic and seismic hazards were determined to be less than significant. No mitigation measures are required.

3.9 Hazardous Materials

This section provides an overview of hazards or hazardous materials and was prepared utilizing the Hazardous Materials Initial Site Assessment included as Appendix H. The analysis is based on the affected environment and project features, and evaluates operational impacts associated with the proposed project.

3.9.1 Affected Environment

A recognized hazardous environmental condition is defined as the presence or likely presence of a hazardous substances or petroleum products on a property that indicate an existing release, a past release, or a material threat of a release of a hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property. This definition does not include “*de minimis* conditions that generally do not pose a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate government agencies.”¹⁸

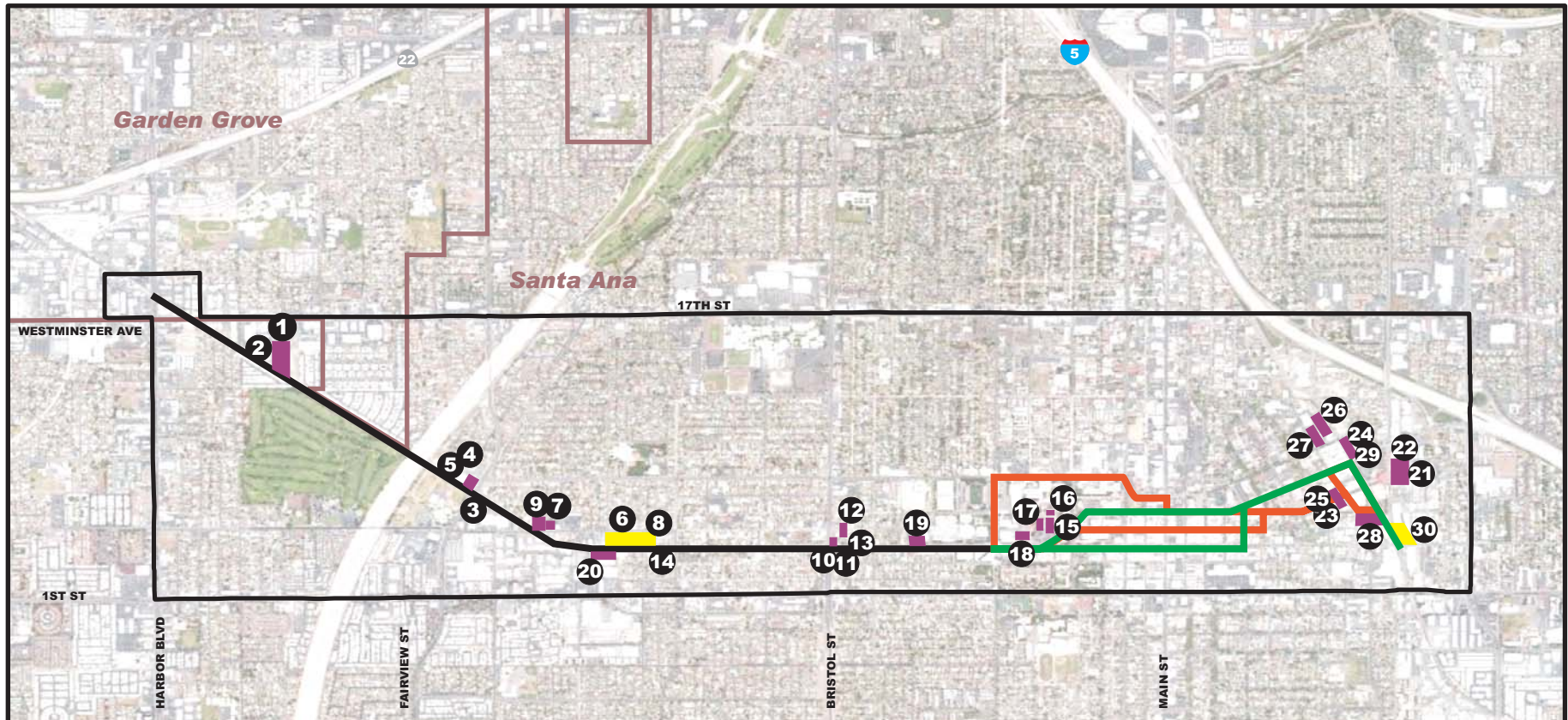
The term “hazardous material” can have varying definitions for different regulatory programs. For the purpose of the proposed project, the term “hazardous materials” refers to both hazardous materials and hazardous waste. The California Health and Safety Code Section 25501(K) defines hazardous materials as “...any material that because of its quantity, concentrations, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environmental if released into the workplace or the environment. Hazardous materials include, but are not limited to, hazardous substances, hazardous waste, and any material which a handler or the administering agency has a reasonable basis for believing would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or environment.”

The assessment of the history of the Study Area was based on historical photographs from Sanborn Fire Insurance Maps, historical topographic maps, and pertinent regulatory databases. An Environmental Data Resources computer database search was conducted to identify hazardous waste sites, underground storage tanks, and/or aboveground storage tanks within a 0.25-mile radius of the project alignment. A total of 30 discrete properties within the 0.25-mile radius were identified as potential hazardous sites. These sites are identified in **Figure 3.9-1**.

¹⁸ American Society for Testing and Materials, Standard E1527-05, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process.



Agency Identified Hazardous Materials Sites



LEGEND:

- City Boundary
- No Further Investigation Required
No Property Acquisition
- Further Investigation Required
Property Acquisition
- Streetcar Alternatives 1 & 2
- Streetcar Alternative 1
- Streetcar Alternative 2

1. ECCO Equipment 1417 N Susan St
2. Anderson Asphalt Paving 1501 N Susan St
Marco Rentals 1501 N Susan St
3. Aria Auto Repair 625 N Fairview St
4. Santa Ana USD 720 N Fairview St
Facilities Relocation Project 720 N Fairview St
5. Otsuka Elementary 802 N Fairview St
Otsuka Farms 802 N Fairview St
6. All Car Auto Parts 2002 W Fifth St
SA Recycling 2002 W Fifth St
7. A&M Metals 2301, 2323 W Fifth St
Crystal Recycling 2323 W Fifth St

8. American Auto Wrecking 1908 W Fifth St
9. Santa Ana Auto Repair 2237 W Fifth St
Nicolas Property 2237 W Fifth St
Andrade Auto Repairs 2237 W Fifth St
10. Unique Cleaners 1245 W Santa Ana Blvd
11. Tune-Up Masters 1247 W Santa Ana Blvd
12. Tropical Ice Cream 1236 W Fifth St
13. Fifth Auto Collision 1228 W Fifth St
14. Flores Trans Specialties 1807 W Fifth St
15. Orange County Facility Ops 10, 12 Civic Center Plaza
16. Civic Center Parking 20 Civic Center Plaza
17. Santa Ana Police Dept 24 Civic Center Plaza
State Building 52028 Civic Center Plaza
18. Federal Occupational Health 34 Civic Center Plaza
General Services 34 Civic Center Plaza
Santa Ana Federal Building 34 Civic Center Plaza
Orange County Central Utility 38 Civic Center Plaza

19. Orange County Morgue 1071 Santa Ana Blvd
20. Robertson Ready Mix 310 N Townsend
21. GSA Transportation Center 1102 E Fruit St
Fruit Street Fueling Station 1102 E Fruit St
22. Orange County Facility Ops 1143 E Fruit St
23. Golden West Circuits 624 N Poinsettia St
24. Tobin Steel 817 E Santa Ana Blvd
25. Santa Ana Diesel 620 N Poinsettia St
American Concrete Cutting 620 N Poinsettia St
So Pacific Transportation 620 N Poinsettia St
Robert Holiday Lines 630 N Poinsettia St
26. All Variety Metals 1016 N Santiago Ave
27. Morrison Co 919 N Poinsettia St
28. Barre Engineering 1000 E Sixth St
29. Reed Thomas 1025 N Santiago Ave
30. Madison Materials 1035 E Fourth St



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3.9.2 Environmental Consequences

3.9.2.1 No Build Alternative

The No Build Alternative includes existing conditions within the Study Area and adds future planned and funded transit and roadway improvement projects. Each of these future projects will be environmentally cleared through separate project-specific environmental documentation. The streetcar would not operate under this alternative and there would not be related hazards or hazardous materials impacts. Therefore, the No Build Alternative would not result in adverse effects related to hazards or hazardous materials.

3.9.2.2 TSM Alternative

The TSM Alternative emphasizes low-cost improvements and operational efficiencies, such as focused traffic engineering actions, expanded bus service, and improved access to transit services. It may include some minor physical enhancements, such as improvements to transit stop amenities (e.g., bus benches). These minor improvements would have no or negligible impacts to hazards or hazardous materials. Therefore, the TSM Alternative would not result in adverse effects related to hazards or hazardous materials.

3.9.2.3 Streetcar Alternatives 1 and 2

Streetcar Alternatives 1 and 2 would require limited acquisition of property which could have the potential to contain hazardous materials. The majority of potentially hazardous properties shown in Figure 3.9-1 would not be acquired or disturbed and do not require further investigation. However, one property identified as a potentially hazardous site would be acquired as part of O & M Facility Site A and three properties identified as potentially hazardous sites would be acquired as part of O & M Facility Site B. O & M Facility Site A includes Madison Materials located at 1035 East 4th Street. O & M Facility Site B includes All Car Auto Parts located at 2002 West 5th Street and SA Recycling located at 2006 West 6th Street, and American Auto Wrecking located at 1908 West 5th Street.

Each of these sites would require detailed Phase I Environmental Site Assessments to ascertain if employees working at the selected O & M Facility would be exposed to toxic levels of hazardous materials. Therefore, without mitigation, Streetcar Alternatives 1 and 2 would result in adverse effects related to existing hazards or hazardous materials at potential O & M Facility Sites A and B.

Operation of the streetcar along the project alignment would not involve the use of hazardous materials. The O&M Facility would provide an area for vehicle and system inspection, cleaning, repair, maintenance, and storage. The following activities would typically occur at the O & M Facility:

- Streetcar service, inspection, painting and component change-out
- Fare collection equipment maintenance
- Streetcar parts and component storage
- OCS and TPSS parts storage

- Maintenance storage for small and large items
- Air conditioning unit removal, replacement and repair
- Truck repair and storage
- Battery charging and storage
- Propulsion and auxiliary inverter service and repair
- Electronic component repairs
- A designated area for interior cleaning of streetcars
- Streetcar storage and circulation
- An automatic drive-through wash facility
- Interior and exterior cleaning
- Sand box filling
- Body repair and paint booth

Chemicals not related to cleaning would be similar to lubrication and hydraulic oils. Other chemicals would be typical to urban areas, similar to chemicals located in automobile repair shops, and do not constitute a substantial risk to public health (e.g., toxic gas release). It is not anticipated that gasoline or diesel fuel would be stored at the selected O & M Facility.

Hazardous wastes would be disposed of in accordance with applicable regulations. There is the potential for hazardous materials/waste spills to occur; however, the storage and disposal of hazardous materials/waste would be conducted in accordance with all federal and State regulatory requirements that are intended to prevent or manage hazards, as well as remediate spills. Periodic site inspections are also performed by regulatory agencies, to ensure that hazardous materials are being handled and disposed of in compliance with all regulatory requirements.

Title 22 of the California Code of Regulations requires that the O & M Facility Manager ensure that all hazardous wastes stored at the Facility are properly contained, labeled, and stored in a properly vented 90-day hazardous waste storage area. As part of these and City requirements, the O & M Facility Manager would:

- Post advisory signs at the hazardous materials storage area and the 90-day hazardous waste storage area;
- Arrange for pick-up of hazardous waste as needed for site operations;
- Allow only properly trained personnel to have access to hazardous waste containers;
- Inspect the 90-day hazardous waste storage area once per week to verify no residues, trash, or spills are present. If a leak or spill is detected, it shall immediately be cleaned using an on-site spill kit supplies; and
- Sweep the 90-day hazardous waste storage area as needed to prevent trash and debris from accumulating.

Streetcar Alternatives 1 and 2 would also include two Standard Conditions of Approval related to the O & M Facility:

- A Spill Contingency Plan for lubrication oils shall be prepared for the O & M Facility and monitored by the O & M Facility Manager. The Spill Contingency Plan provides guidelines that would be adhered to by on-site employees for the prevention, containment, clean up, and disposal of lubrication oil spills. The Plan shall be provided to new employees within four weeks of startup and shall be reviewed annually. The Spill Contingency Plan shall be kept current and would be updated as necessary to reflect the nature of materials being used, stored, or handled at the O & M Facility.
- The O & M Facility Manager shall be responsible for making appropriate disclosures of the on-site storage of hazardous materials in accordance with the Orange County Fire Authority and US Department of Transportation regulations. This includes a Hazardous Materials Disclosure Chemical Inventory and Business Emergency Plan and a list of all hazardous, flammable, and combustible liquids, solids, and gases to be stored, used, or handled on-site. All new hazardous materials brought on-site in quantities greater than 55 gallons shall be added to the inventory and reported to the County Fire Authority within 30 days. Material Data Safety Sheets shall be available at the O & M Facility for all hazardous materials used on-site. On an annual basis, the O & M Facility Manager shall ensure that the list and associated plans are amended as necessary to include the current status of hazardous materials.

Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to hazards or hazardous materials at the selected O & M Facility.

3.9.2.4 IOS-1 and IOS-2

The assessment of hazardous materials for the IOS Alternatives is identical to the assessment presented above for Streetcar Alternatives 1 and 2. The only difference would be that the O & M Facility would store five transit vehicles under IOS-1 and six transit vehicles under IOS-2. As explained above, the storing and use of hazardous materials at the O & M Facility would not result in adverse effects. However, existing conditions at O & M Facility Sites A and B would potentially result in the exposure of employees to toxic levels of hazardous materials. Therefore, without mitigation, IOS-1 and IOS-2 would result in adverse effects related to existing hazards or hazardous materials at the O & M Facility.

3.9.3 Measures to Minimize Harm

Two standard conditions of approval would require the preparation of a Spill Contingency Plan for lubrication oils and a Hazardous Materials Disclosure Chemical Inventory and Business Emergency Plan to identify hazardous materials on site. Hazardous Materials effects associated with potential O & M Facility Sites A and B were determined to be adverse without mitigation. Implementation of Mitigation Measure HAZ1 would eliminate these adverse effects.

HAZ1 If Operations & Maintenance (O & M) Facility Site A is chosen to service transit vehicles, the City of Santa Ana shall require a Phase I Environmental Site Assessment for the following site:

- Madison Materials located at 1035 East 4th Street

If O & M Facility Site B is chosen to service transit vehicles, a Phase I Environmental Site Assessment shall be prepared for the following sites:

- All Car Auto Parts located at 2002 West 5th Street
- SA Recycling located at 2006 West 5th Street
- American Auto Wrecking located at 1908 West 5th Street

The assessment shall be prepared by a Registered Environmental Assessor. The assessment shall be prepared in accordance with State standards/guidelines to evaluate whether the site or the surrounding area is contaminated with hazardous substances from the potential past and current uses including storage, transport, generation, and disposal of toxic and hazardous waste or materials. If hazardous materials are identified in the Phase I Environmental Site Assessment, a Phase II Environmental Site Assessment would be completed to identify the extent of contamination and the procedures for remediation. The Phase II Environmental Site Assessment shall be approved by the California Department of Toxic Substances Control.

3.9.4 CEQA Determination

3.9.4.1 Significance Criteria and Significance Criteria Application

In accordance with Appendix G of the State CEQA Guidelines, the proposed project would have a significant impact related to hazardous materials if it would:

- Create a significant hazard to the public or the environment through the routine transport, use or disposal of hazardous materials;
- 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;
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substance or waste within one-quarter mile of an existing or proposed school;
- Be located on a site which is located on a list of hazardous materials sites compiled pursuant to Government Code Section 659662.5 and, as a result, would create a significant hazard to the public or the environment;
- Be located within an airport land use plan (or where such a plan has not been adopted, within two miles where of a public airport or public use airport), which would result in a safety hazard for people residing or working in the project area;
- Be located within the vicinity of a private airstrip, would result in a safety hazard for people residing or working in the project area;
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; and/or

- 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.

No Build Alternative

As discussed in Section 3.9.2.1 above, the streetcar would not operate under the No Build Alternative, and, consequently, there would not be related effects from hazards or hazardous materials. Therefore, the No Build Alternative would result in no impacts related to hazards and hazardous materials.

TSM Alternative

As discussed in Section 3.9.2.2 above, the TSM Alternative would not involve improvements that would have a significant impact related to hazardous materials. The TSM Alternative would involve only minor improvements that would have negligible impacts. Furthermore, the TSM Alternative is not located within an airport land use plan, within close proximity of a private airstrip, or adjacent to wildlands, and would not interfere with an adopted emergency response plan. Therefore, TSM Alternative would result in no impacts related to hazards or hazardous materials.

Streetcar Alternatives 1 and 2

Hazardous Materials. As discussed in Section 3.9.2.3 above, there is a potential for hazardous materials/waste spills to occur at either proposed O & M Facility Site A or B. This is of importance, as O & M Facility Site A is located approximately 0.14 miles from Garfield Elementary School at 850 Brown Street and O & M Facility Site B is located 0.20 miles from John C. Fremont Elementary School at 1930 10th Street and 0.20 miles from Romero-Cruz Elementary School at 1512 Santa Ana Boulevard. The O & M Facility would store hazardous materials/waste primarily for cleaning and routine maintenance of the streetcars and tracks, and would likely house cleaning chemicals, lubrication oils, and hydraulic oils. However, the storage and disposal of hazardous materials/waste would be conducted in accordance with all federal and State regulatory requirements that are intended to prevent or manage hazards and/or remediate spills, including periodic site inspections for compliance with these required practices. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to hazardous materials.

Hazardous Sites. As discussed in Section 3.9.2.3 above, one property, identified as a potentially hazardous site, would be acquired as part of O & M Facility Site A and three properties, identified as potentially hazardous sites, would be acquired as part of O & M Facility Site B. Each of these sites would require Phase I Environmental Site Assessments to ascertain if employees working at the O & M Facility would be exposed to toxic levels of hazardous materials. Therefore, without mitigation, Streetcar Alternatives 1 and 2 would result in significant impacts related to hazardous sites.

Airport Hazards. The streetcar alignment is approximately 4.3 miles from the nearest airport (John Wayne Airport). The proposed alignment is not within an airport land use plan or near

a private airstrip. Therefore, Streetcar Alternatives 1 and 2 would result in no impacts related to airport hazards.

Emergency Response and Evacuation Plans. Streetcar Alternatives 1 and 2 would operate both in an exclusive ROW and within mixed-flow traffic. The exclusive PE ROW portion of the proposed alignment would not block or interrupt emergency access or evacuation routes. The on-street portion of the alignment would add streetcars to mixed-flow traffic, which would also have no substantial impact on emergency access or evacuation routes. However, should a major accident or emergency occur, emergency vehicles could, with permission from OCTA, use the PE ROW as an emergency access or evacuation route. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to emergency response and evacuation plans.

Wildland Fires. Streetcar Alternatives 1 and 2 are located in a fully urbanized area and are not located adjacent to or intermixed with wildlands. These alternatives would not subject people or structures to a significant risk of loss, injury, or death as a result of exposure to wildland fires. Therefore, Streetcar Alternatives 1 and 2 would result in no impacts related to wildland fires.

IOS-1 and IOS-2

The assessment of hazards and hazardous materials for the IOS Alternatives is identical to the assessment presented above for Streetcar Alternatives 1 and 2. The only difference would be that PE ROW would not be relevant to emergency response or evacuation plans. Existing conditions at O & M Facility Sites A and B would potentially result in the exposure of employees to toxic levels of hazardous materials. Therefore, without mitigation, IOS-1 and IOS-2 would result in significant impacts related to hazardous sites.

3.9.4.2 Significance After Mitigation

Impacts related to hazardous sites were determined to be significant without mitigation. Implementation of Mitigation Measure **HAZ1**, as identified in Section 3.9.3 above, would reduce the impacts to less-than-significant.

3.10 Traffic and Parking

This section provides an overview of traffic and parking and was prepared utilizing the Traffic Impact Assessment Report included as Appendix I. The analysis is based on the affected environment and project features, and evaluates operational impacts associated with the proposed project.

3.10.1 Affected Environment

3.10.1.1 Freeway Network

Interstate 5 (I-5) traverses through the northeast corner of the Study Area, within one-half mile of the eastern terminus. I-5 is a major commuter and goods movement corridor that stretches from the United States border with Mexico through Orange County and northward

to the United States border with Canada. I-5, in and near the Study Area, is a ten-lane freeway plus carpool lanes. One key feature of I-5 on the eastern edge of the Study Area is a carpool lane direct access ramp to and from Grand Avenue.

State Route 22(SR 22) roughly parallels the Study Area approximately one mile to the north. SR 22 has six general purpose lanes and one carpool lane in each direction, plus auxiliary lanes between interchanges. It is a limited-access corridor that provides access to the central Orange County cities of Westminster, Garden Grove, Santa Ana, and Orange.

Other area freeways surround the Study Area, such as State Route 57 (SR 57), and State Route 55 (SR 55). However, I-5 and SR 22 are the closest in proximity to the Study Area and the most pertinent to the related regional transportation network.

3.10.1.2 Arterial Network

Several regionally and locally important roadways traverse the Study Area. The key roadways and their speed limits are listed below.

- 4th Street (25 miles per hour [mph])
- 5th Street (30 mph)
- Santa Ana Boulevard (30 mph)
- Flower Street (30 to 35 mph)
- Civic Center Drive (35 mph)
- Westminster Avenue/17th Street (40 mph)
- Bristol Street (40 mph)
- Broadway(35 mph)
- Main Street (30 mph)
- Santiago Street (25 mph)

Intersections

Traffic impacts have been assessed at the 42 key intersections identified in **Figure 3.10-1**. The efficiency of traffic operations at a location is measured in terms of Level of Service (LOS). LOS is a description of traffic performance at intersections and is a measure of average operating conditions at intersections during the peak travel hour. It is based on a volume-to-capacity (V/C) ratio for signalized intersections and the average delay per vehicle for unsignalized locations. Levels range from A to F, with A representing excellent (free-flow) conditions and F representing extreme congestion. The Cities of Santa Ana and Garden Grove have established LOS D as the minimum acceptable level of service for intersections.

The following intersections are currently operating at LOS E or F (unacceptable) during either the AM or PM peak hour:

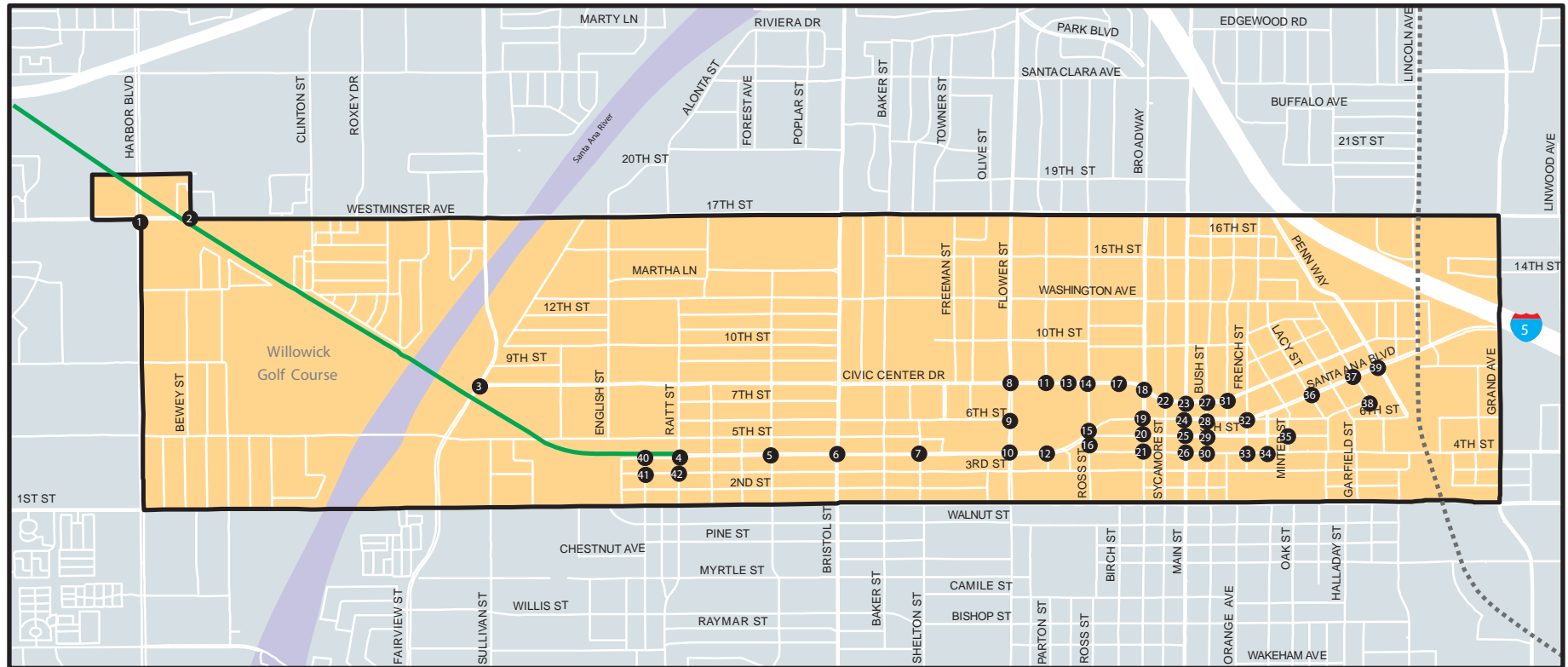
- Westminster Avenue/Harbor Boulevard - PM Peak Hour
- Santa Ana Boulevard/Raitt Street - AM and PM Peak Hour
- Santa Ana Boulevard/Lacy Street - AM Peak Hour
- 3rd/Raitt Streets - PM Peak Hour

The Orange County Congestion Management Program (CMP) was established in 1991 to reduce traffic congestion and to provide a mechanism for coordinating land use and development decisions. Compliance with the CMP requirements ensures a city's eligibility to compete for gas funds for local transportation projects. Within the defined CMP network of State highways and principal arterials, CMP intersections are not allowed to deteriorate to a condition which is worse than LOS E or the base year LOS, if worse than E, without mitigation being prescribed in an acceptable deficiency plan. The Harbor Boulevard/1st Street intersection, which operates at LOS C in the AM and PM peak hours, is the only CMP intersection within the Study Area.

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Study Area Intersections



LEGEND:

- Study Area
- PE ROW
- Metrolink/Amtrak Rail Line
- Study Area Intersection

0 1500 3000 FEET

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Segments

A roadway segment analysis has been completed for the Study Area. The following locations are currently operating at LOS E or F (unacceptable) during either the AM or PM peak hour:

- 5th Street from Hawley to Raitt Streets
- 4th Street from Main to Mortimer Streets
- Raitt Street from 5th to 3rd Streets
- Bristol Street from 5th to 3rd Streets
- Main Street from 5th to 3rd Streets

Existing Bicycle Access

An existing Class I (off-street) bikeway runs along the Santa Ana River north to south through the Study Area. Other Class I bikeways exist and are planned elsewhere in the City. The PE ROW is designated for future implementation of a Class I bikeway. Similarly, portions of Raitt Street, Ross Street, Santa Ana Boulevard, Fairview Street, Flower Street, Harbor Boulevard, and 17th Street in the Study Area are also designated for future implementation of Class II bikeways, striped lanes on a street or highway for bike travel.

Existing On-Street Parking

Along the proposed alignment, on-street parking is allowed on 4th Street, 5th Street, and Civic Center Drive in designated areas. Listed below are the number and locations of the parking spaces:

- 130 spaces on 4th Street between Ross and French Streets
- 140 spaces on Santa Ana Boulevard between Raitt Avenue and Flower Street
- 33 spaces on 5th Street between Ross and Minter Streets

Existing Off-Street Parking

Existing parking facilities include the courthouse parking structure with 550 available spaces, the old courthouse surface parking lot with 25 spaces, SARTC at Santa Ana Boulevard and Santiago Street with 700 spaces, the Orange County Health Care Agency parking structure along West 5th Street with 600 spaces, the two parking structures along West 3rd Street that serve the businesses along West 3rd Street and West 4th Street, and other public parking structures located along East and West 5th Street, including the Fiesta Marketplace parking structures.

Major Development Areas

The Study Area contains (or passes through) two Major Development Areas (MDAs) as identified by the City of Santa Ana. MDA #3 is known as the Downtown District and MDA #9 is known as the Transit Village District. The Transit Village District is envisioned as a vibrant intense urban village with a balance of employment centers, residential and service uses. Pedestrian and transit linkages to SARTC are key in this district.

3.10.1.3 Public Transportation Services

OCTA provides fixed route bus service and a countywide shared ride service, ACCESS, in Orange County. **Figure 3.10-2** shows the OCTA fixed route bus service in and around the Study Area. A subset of OCTA's fixed route bus service is a rail station feeder-distributor service known as StationLink. OCTA currently operates a StationLink route (currently Route 462) in the Study Area between SARTC and the Downtown/Civic Center area of Santa Ana. SARTC is a hub of public transit service for central Orange County, serving as a major stopping and transfer point for intercity, interstate, and international bus services such as Greyhound and Transportes Intercalifornias.

OCTA, in coordination with the Southern California Regional Railroad Authority, operates commuter rail service in Orange County under the name Metrolink. Metrolink trains on the Orange County Line provide service between Oceanside and Downtown Los Angeles; and between Oceanside and San Bernardino. The National Railroad Passenger Corporation operates intercity and transcontinental rail passenger service under the operating name Amtrak. One of Amtrak's highest ridership intercity services in the country, the Pacific Surfliner, passes through Orange County, overlapping service with Metrolink, and on some of the same tracks on which Metrolink operates.

3.10.2 Environmental Consequences

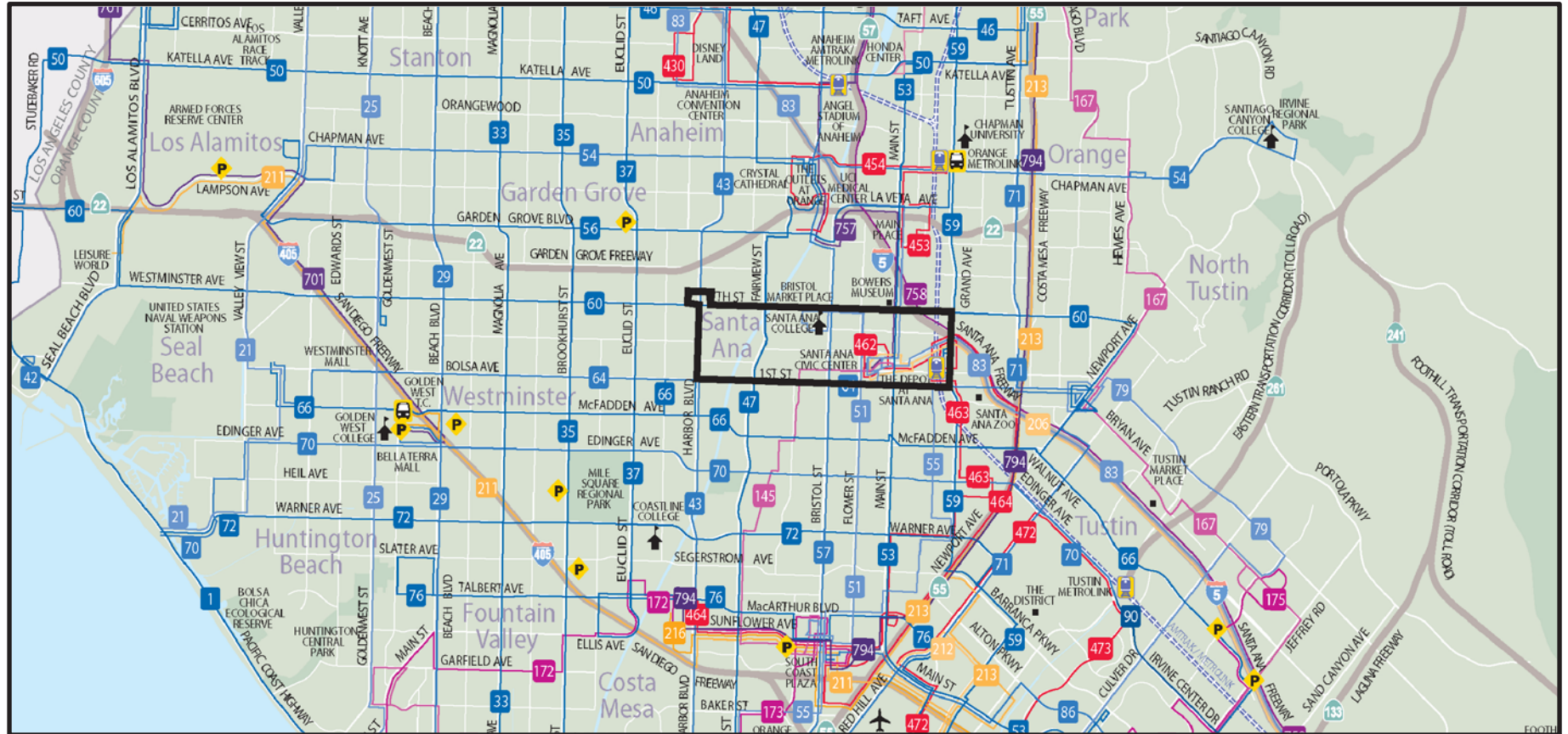
The traffic analysis was prepared in accordance with requirements of City of Santa Ana and the Orange County CMP. The traffic analysis also considered the requirements of the City of Garden Grove. Traffic forecasts were developed for year 2035 using the travel demand forecasting model known as Orange County Transportation Analysis Model (OCTAM), version 3.3. OCTAM reflects general ambient growth in background traffic over time, reflecting the cumulative impacts of general plan buildout throughout the modeling area.

A combination of analysis methodologies has been utilized for intersection LOS analysis for this traffic analysis. The Intersection Capacity Utilization (ICU) method was used for signalized intersections and the Highway Capacity Manual (HCM) was used for unsignalized intersections.


The ICU method of analysis compares critical turn movements through signalized intersections based on a specific flow rate capacity for through and turn lanes. The ICU value translates to a LOS estimate, which is a relative measure of the intersection performance. Delays from the operation of the streetcar within the roadways are factored into the LOS. The resultant ICU calculations provide a LOS based on the following as listed in **Table 3.10-1**.




OCTA Fixed Route Bus Service



LEGEND:

 Study Area

0 2250 4500
FEET



Source: OCTA System Map, 2011.

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TABLE 3.10-1: LOS CRITERIA FOR SIGNALIZED INTERSECTIONS

LOS	Volume/Capacity (V/C) Ratio	Definition
A	≤ 0.60	EXCELLENT. No vehicle waits longer than one red light and no approach phase is fully used.
B	0.61-0.70	VERY GOOD. An occasional approach phase is fully utilized; many drivers begin to feel somewhat restricted within groups of vehicles.
C	0.71-0.80	GOOD. Occasionally drivers may have to wait through more than one red light; backups may develop behind turning vehicles.
D	0.81-0.90	FAIR. Delays may be substantial during portions of the rush hours, but enough lower volume periods occur to permit clearing of developing lines, preventing excessive backups.
E	0.91-1.00	POOR. Represents the most vehicles intersection approaches can accommodate; may be long lines of waiting vehicles through several signal cycles.
F	> 1.01	FAILURE. Backups from nearby locations or on cross streets may restrict or prevent movement of vehicles out of the intersection approaches. Potentially very long delays with continuously increasing queue lengths.

Source: Transportation Research Board, 1980. Circular 212 – Interim Materials on Highway Capacity.

The HCM method of analysis evaluates minor street stop intersections based on the average total delay for the entire intersection. Total delay is defined as the total elapsed time from when a vehicle stops at the end of a queue until the vehicle departs from the stop line. **Table 3.10-2** presents LOS criteria used for analysis of the unsignalized intersections.

TABLE 3.10-2: LOS CRITERIA FOR ALL-WAY STOP AND MINOR STREET STOP INTERSECTIONS

LOS	Average Total Delay (Sec/Veh)
A	0-10
B	> 10 -15
C	> 15-25
D	> 25-35
E	> 35-50
F	> 50

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

Consistent with the City of Santa Ana General Plan Circulation Element, the LOS for roadway segments were evaluated by comparing the roadway segment volumes to the LOS capacities described in **Table 3.10-3**.

TABLE 3.10-3: LOS FOR ARTERIAL STREET SEGMENTS BASED ON DAILY TRAFFIC VOLUME

Roadway Classification	Lanes/ Configuration	LOS A	LOS B	LOS C	LOS D	LOS E	LOS F
Principal Arterial	8 Lanes Divided	45,000	52,500	60,000	67,500	75,000	> 75,000
Major Arterial	6 Lanes Divided	33,900	39,400	45,000	50,600	56,300	> 56,300
Primary Arterial	4 Lanes Divided	22,500	26,300	30,000	33,800	37,500	> 37,500
Secondary Arterial	4 Lanes Undivided	15,000	17,500	20,000	22,500	25,000	> 25,000
Commuter Street	2 Lanes Undivided	7,000	8,800	10,000	11,300	12,500	> 12,500

Source: City of Santa Ana, General Plan –Circulation Element, 1998, Reformatted 2010.

The City of Santa Ana impact criteria are based on the General Plan that has established LOS D as the threshold for an acceptable service level for the majority of signalized intersections. In MDAs, the City considers LOS E as the minimum acceptable service level for signalized intersections. The City of Santa Ana does not have impact criteria for unsignalized intersections.

In general, for intersections either located outside or within an MDA, an impact is considered substantial if the project-related increase in the V/C ratio equals or exceeds 0.01 when compared to No Build conditions that are projected to operate at LOS E or F.

The Garden Grove General Plan has established LOS D as the impact criteria for an acceptable service level for signalized intersections. These criteria are consistent with City of Garden Grove impact criteria for evaluating project impacts at signalized intersections.

CMP intersections are not allowed to deteriorate to a condition which is worse than LOS E. The impact criteria for traffic impacts for the Cities of Santa Ana and Garden Grove are more stringent than the impact criteria for the CMP.

3.10.2.1 No Build Alternative

The No Build Alternative includes existing conditions within the Study Area and adds future planned and funded transit and roadway improvement projects. Each of these future projects will be environmentally cleared through separate project-specific environmental documentation. This alternative includes three regional bus rapid transit routes to be implemented by OCTA. One of these routes, the Westminster Avenue/17th Street BRT Corridor, skirts the northern boundary of the Study Area. It is anticipated that all three of the proposed routes would regionally improve congestion but would only marginally improve congestion in the Study Area. The No Build Alternative also includes the Bristol Street Widening Project, which will widen Bristol Street from four to six lanes between Warner Avenue and Memory Lane, and the Grand Avenue Widening Project, which will widen Grand Avenue from four to six lanes between 1st and 17th Streets. These improvements are consistent with the City of Santa Ana General Plan. As a result of the Bristol Street Widening Project, the roadway segments along Bristol Street would improve from LOS E to LOS B. However, with the exception of Bristol Street, the No Build Alternative would generally result in continued deterioration of local mobility with falling average travel speeds, reduced levels of service and increased vehicle miles traveled and vehicle hours traveled in association with future growth in population and jobs.

As shown in **Table 3.10-4**, five intersections would operate at LOS E or F during the AM or PM peak hour in year 2035 under the No Build Alternative. This compares to four intersections currently operating at LOS E or F under existing conditions. The No Build Alternative would result in greater intersection congestion than existing conditions but would not alter existing parking supply or demand in the Study Area. The No Build Alternative would not adversely affect parking. However, the No Build Alternative would result in adverse effects related to traffic.

TABLE 3.10-4: IMPACTED INTERSECTIONS UNDER EXISTING CONDITIONS AND THE NO BUILD ALTERNATIVE

Existing Conditions	No Build Alternative
Westminster Ave./Harbor Blvd. - PM Peak Hour	Westminster Ave./Harbor Blvd. - PM Peak Hour
Santa Ana Blvd./Raitt St. - AM and PM Peak Hour	Santa Ana Blvd./Raitt St. - AM and PM Peak Hour
Santa Ana Blvd./Lacy St. - AM Peak Hour	Flower St./Civic Center Dr. - PM Peak Hour
3 rd St./Raitt St. - PM Peak Hour	Civic Center Dr./Spurgeon St. - PM Peak Hour
	3 rd St./Raitt St. - PM Peak Hour

Source: City of Santa Ana, Santa Ana and Garden Grove Fixed Guideway Project Traffic Impact Assessment Report, February 2012.

3.10.2.2 TSM Alternative

The TSM Alternative emphasizes low-cost improvements and operational efficiencies, such as focused traffic engineering actions, expanded bus service, and improved access to transit services. It may include some minor physical enhancements such as improvements to transit stop amenities (e.g., bus benches). This would reduce regional congestion and improve local mobility.

At the intersection level, the pattern of congestion is similar to the No Build Alternative. However, all study intersections are expected to operate slightly better than the No Build Alternative. This is mostly due to reduction of vehicle trips from the highway system as a result of potential auto trips diverted to the improved transit.

As shown in **Table 3.10-5**, four intersections would operate at LOS E or F during the AM or PM peak hour in year 2035 under the TSM Alternative. This compares to five intersections operating at LOS E or F under the No Build Alternative. Overall, most intersections experience a slight improvement in operations. The TSM Alternative does not include changes to either the parking supply or parking demand within the Study Area. Therefore, the TSM Alternative would not result in adverse effects related to traffic and parking.

TABLE 3.10-5: IMPACTED INTERSECTIONS UNDER THE NO BUILD ALTERNATIVE AND TSM ALTERNATIVE

No Build Alternative	TSM Alternative
Westminster Ave./Harbor Blvd. - PM Peak Hour	Westminster Ave./Harbor Blvd. - PM Peak Hour
Santa Ana Blvd./Raitt St. - AM and PM Peak Hour	Santa Ana Blvd./Raitt St. - AM and PM Peak Hour
3 rd St./Raitt St. - PM Peak Hour	3 rd St./Raitt St. - AM and PM Peak Hour
Flower St./Civic Center Dr. - PM Peak Hour	Fairview St./Civic Center Dr. - PM Peak Hour
Civic Center Dr./Spurgeon St. - PM Peak Hour	

Source: City of Santa Ana, Santa Ana and Garden Grove Fixed Guideway Project Traffic Impact Assessment Report, February 2012.

3.10.2.3 Streetcar Alternatives 1 and 2

The following subsections assess intersections, segments, grade crossings, stations, and parking.

Intersection Analysis

An intersection analysis was completed that accounted for streetcar operations in mixed traffic. All intersections assessed for Streetcar Alternatives 1 and 2 would operate at similar or improved LOS as the No Build Alternative. Intermediate stations in both Streetcar Alternatives 1 and 2 are estimated to have minimal traffic impacts as only the terminus stations provide parking. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to intersection LOS.

The Harbor Boulevard/1st Street intersection is the only CMP intersection within the Study Area. Streetcar Alternatives 1 and 2 would not change the LOS at this intersection. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to the CMP.

Roadway Segment Analysis

A roadway segment capacity analysis was completed because Streetcar Alternatives 1 and 2 would operate in mixed traffic in the central and eastern portion of the Study Area. Streetcar Alternatives 1 and 2 do not cause additional roadway segments to experience capacity deficiencies beyond those identified in the No Build Alternative. This improvement is consistent with the City of Santa Ana General Plan. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to roadway segments.

Grade Crossing Analysis

Gated grade crossing would be located at two locations west of Raitt Street where surface arterials cross the streetcar tracks within the OCTA owned right-of-way. Gate crossings are required by the CPUC in railroad right-of-way. For traffic operations at the crossing or adjacent to the crossing, the deployment of gates to allow street cars to pass adds a new time delay and may cause vehicles to queue while waiting for the streetcar to pass. One crossing would be located on Fairview Street south of Civic Center Drive. The delay that will be introduced to this intersection with each streetcar crossing is estimated to be approximately 35 seconds. With 10-minute headways during peak periods, there will be a maximum of 12 streetcar crossing per hour. The vehicle queue at the Fairview Street/Civic Center Drive intersection is projected to extend beyond the streetcar crossing. However, the proposed railroad and signal control improvements, which include advanced railroad preemption and signal coordination, would provide sufficient clearance time for vehicles to clear the proposed grade crossings. The second grade crossing would be located on 5th Street west of Hawley Street. No signalized intersections are located in close proximity to the grade crossing at 5th and Hawley Streets, and it does not require a queuing analysis. The grade crossings would include railroad crossing signal controls and raised medians from both approaches. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to grade crossings.

Pedestrian Circulation Analysis

There is a number of potentially high-pedestrian activity areas along the streetcar alternative alignments including near streetcar stations, in the Downtown and Civic Center areas, and near the four schools located along the alignment. In the Downtown and Civic Center areas,

this tends to be during the morning and afternoon peak hours, as the work day begins and ends, and during the midday lunch period. The majority of pedestrian activity at the schools occurs for approximately 30 minutes prior to the start of school in the morning, and for approximately 30 minutes after school is dismissed in the afternoon. Section 3.15 (Safety and Security) describes the effects of streetcar activity on pedestrian safety and describes the measures to minimize potentially harmful effects.

Station Circulation and Parking Analysis

Streetcar Alternatives 1 and 2 would result in increased passenger vehicle activity and increased pedestrian activity around stations at the termini. Residents, employees, and visitors would access all intermediate stations on foot, other modes of transit, or bus. It is not anticipated that intermediate stations would be accessed by automobile and no intermediate pick-up/drop-off areas would be provided for passenger vehicles. Some individuals might drive to the Civic Center area to access the Streetcar system but current ridership forecasts predict these occurrences would be few. Pedestrian activity would increase around the station areas. Sidewalks are currently present on both sides of all street alignments, except for an approximately 300-foot segment of 6th Street near Santiago Street that lacks a sidewalk on the south side of the street. In addition, some sidewalks may need to be improved to comply with the ADA. Streetcar Alternatives 1 and 2 would not require improvements associated with additional pedestrian access to the streetcar station areas, except to ensure ADA compliance and public safety. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to pedestrian activity.

Station parking would be provided at the Harbor Boulevard/Westminster Avenue Station and SARTC. This station would include 50 parking spaces within the PE ROW. This configuration would include “right in, right out only” access to the parking lot to and from Westminster Avenue and Harbor Boulevard. It is not anticipated that these right turns would substantially affect intersection movements. This station may increase U-turns at the Harbor Boulevard/Westminster Avenue intersection due to the anticipated “right-in/right-out only” vehicle access. Given the relatively small number of parking spaces available, the increase in U-turns at the intersection would not substantially affect intersection movements. In addition, it is anticipated that the 50 parking spaces would be enough to accommodate the expected park-and-ride volumes and parking overflow would not affect surrounding streets. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to vehicle activity at the Harbor Boulevard/Westminster Avenue Station.

Regarding vehicle activity at SARTC, it is not expected that Streetcar Alternatives 1 and 2 would attract a significant volume of commuters using SARTC as a park-and-ride to access the streetcar system. It is expected that streetcar patrons would come primarily from Metrolink and Amtrak, and secondarily from other local and intercity bus services that also utilize SARTC. It is anticipated that 31 surface parking spaces would be removed at SARTC. However, excess parking capacity exists in the SARTC parking structure to absorb the loss of the 31 surface lot spaces. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to vehicle activity at SARTC.

Street Parking Analysis

Streetcar Alternative 1 includes removal of street parking on Santa Ana Boulevard between Raitt and Flower Streets and three parking scenarios that would each affect a different number of parking spaces along 4th Street. As shown in **Table 3.10-6**, 53 percent of street parking would be removed along Santa Ana Boulevard between Raitt and Flower Streets.

TABLE 3.10-6: STREET PARKING SPACES (STREETCAR ALTERNATIVE 1)			
Scenario and Segment	Existing Spaces	Spaces	
		Lost	Remaining
STREETCAR ALTERNATIVE 1			
Santa Ana Boulevard between Raitt and Flower Streets	143	73	70
4th STREET PARKING SCENARIO A – SOUTH SIDE PARALLEL PARKING			
Santa Ana Boulevard between Bush and Lacy Streets	69	14	55
4 th Street between Ross and Mortimer Streets	136	26	110
Mortimer Street between 4 th and 6 th Streets	22	7	15
Subtotal	227	47	180
4th STREET PARKING SCENARIO B – NO SOUTH SIDE PARALLEL PARKING			
4 th Street between Ross and Mortimer Streets	136	77	59
4th STREET PARKING SCENARIO C – NO SOUTH AND NORTH SIDE PARKING REMOVAL			
4 th Street between Ross and Mortimer Streets	136	132	4

Source: City of Santa Ana, Santa Ana and Garden Grove Fixed Guideway Project Traffic Impact Assessment Report, February 2012.

Fourth Street Parking Scenario A would reconfigure south side parking along 4th Street from diagonal to parallel, resulting in the loss of approximately 21 percent of spaces (47 parking spaces). Fourth Street Parking Scenario B would remove south side parking along 4th Street, resulting in the loss of approximately 57 percent of spaces (77 parking spaces). Fourth Street Parking Scenario C would remove the majority of south and north side parking along 4th Street, resulting in the loss of approximately 97 percent of spaces (132) parking spaces). The loss of parking on Santa Ana Boulevard between Raitt and Flower Streets would affect residential land uses. The City of Santa Ana requires every residential property along this segment of Santa Ana Boulevard to have on-site parking capacity consistent with City zoning and occupancy entitlements. There is adequate although potentially less convenient parking to accommodate residential parking needs along this segment of Santa Ana Boulevard. Therefore, Streetcar Alternative 1 would not result in adverse effects related to residential land uses and the loss of on-street parking spaces.

The loss of parking on 4th Street would be absorbed into nearby parking structures, including public parking structures along 3rd and 5th Streets (e.g., East End shopping district parking structures) and potentially the Orange County Health Care Agency parking structure along 5th Street. Therefore, Streetcar Alternative 1 would not result in adverse effects related to the loss of street parking on 4th Street associated with any of the parking scenarios.

Streetcar Alternative 2 would affect street parking on Santa Boulevard between Raitt and Flower Streets and on Civic Center Drive. As shown in **Table 3.10-7**, 53 percent of street

parking would be removed along Santa Boulevard between Raitt and Flower Streets. In addition, 16 percent of spaces (35 spaces) would be removed in the Civic Center area on 5th, Minter, 6th, Brown, Poinsettia, and Spurgeon Streets.

TABLE 3.10-7: STREET PARKING SPACES (STREETCAR ALTERNATIVE 2)			
Scenario and Segment	Existing Spaces	Spaces	
		Lost	Remaining
STREETCAR ALTERNATIVE 2			
Santa Ana Boulevard between Raitt and Flower Streets	143	73	70
DOWNTOWN SEGMENT			
Santa Ana Boulevard between Spurgeon and French Streets	8	5	3
5 th Street between Ross and Minter Streets	33	7	26
Minter Street between 5 th and 6 th Streets	20	6	14
6 th Street between French and Lacy Streets	59	0	59
Brown Street between Lacy and Poinsettia Streets	48	23	25
Poinsettia Street between Santa Ana Boulevard and 6 th Street	40	(7) /a/	47
Spurgeon Street between Civic Center Drive and Santa Ana Boulevard	11	1	10
Subtotal	219	35	184

/a/ Parentheses reflect parking spaces gained.

Source: City of Santa Ana, Santa Ana and Garden Grove Fixed Guideway Project Traffic Impact Assessment Report, February 2012.

The loss of parking on Santa Ana Boulevard between Raitt and Flower Streets would affect residential land uses. The City of Santa Ana requires every residential land use along this segment of Santa Ana Boulevard to have on-site parking, consistent with City zoning and occupancy entitlements. Therefore, Streetcar Alternatives 2 would not result in adverse effects related to residential parking and the loss of on-street parking spaces.

The loss of parking in the Civic Center area would be minimal (35 spaces) and absorbed into nearby parking structures. Therefore, Streetcar Alternative 2 would not result in adverse effects related to the loss of street parking in the Civic Center area.

OCTA allows Templo Calvario Church to park within the PE ROW on a temporary basis with a 30-day "notice to vacate" provision. The CUP granted to Templo Calvario by the City of Santa Ana indicates that overflow parking should use street parking, as well as available parking at nearby facilities. It is anticipated that these facilities would be able to accommodate Church parking volumes. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to the loss of PE ROW parking for Templo Calvario.

Driveway Analysis

Streetcar Alternatives 1 and 2 would affect access to driveways of four businesses (Table 3.10-8). Streetcar implementation would result in the closure of a driveway associated with Chief Eagle Building Materials business located at 3526 Westminster Avenue. This

business has a second driveway approximately 25 to 35 feet to the east of the affected driveway. This driveway has adequate capacity to handle traffic associated with this business. Therefore, Streetcar Alternatives 1 and 2 would not have an adverse effect related to Chief Eagle Building Materials.

TABLE 3.10-8: DRIVEWAY EFFECTS			
Business	Address	Build Alternative	Effect
Chief Eagle Building Materials	3526 Westminster Ave	Streetcar Alternatives 1 and 2	Close one driveway, reconfigure parking area
Vacant (Previously Santa Ana Florist)	315 Bristol St.	Streetcar Alternatives 1 and 2	Close one driveway
Austin Hardwoods & Hardware	610 Santiago St.	Streetcar Alternative 2, IOS-2	Relocate one driveway. Make exit right turn only
Taller San Jose	801 Broadway	Streetcar Alternative 2, IOS-2	Modify existing driveway

Source: Terry A. Hayes Associates Inc., 2012.

Streetcar Alternatives 1 and 2 would affect a driveway associated with a vacant structure and parking area previously occupied by Santa Ana Florist located at 315 Bristol Street. Two driveways provide access to this vacated property: one on Bristol Street and the other on Santa Ana Boulevard. The driveway on Santa Ana Boulevard would be permanently closed to support eastbound tracks and a station. The building is currently vacant and has been enclosed by a perimeter fence to discourage vandalism and unauthorized access. Potential future business(es) that occupy this property would have access via the driveway along Bristol Street. Therefore, Streetcar Alternatives 1 and 2 would not have an adverse effect related to 315 Bristol Street.

Streetcar Alternative 2 would affect a driveway associated with Austin Hardwoods & Hardware located at 610 Santiago Street. The business has three existing access driveways along Poinsettia Street, Santiago Street, and East 6th Street. There are currently no right or left turn restrictions on vehicles exiting onto Poinsettia Street. With implementation of Streetcar Alternative 2, vehicles exiting onto Poinsettia Street would be prohibited from making left turns. This effect is considered minor as no access to the businesses will be restricted. Therefore, Streetcar Alternative 2 would not have an adverse affect related Austin Hardwoods & Hardware.

Streetcar Alternative 2 would affect a driveway associated with the Taller San Jose facility located at 801 Broadway. The driveway for Taller San Jose is located on the northern portion of Civic Center Drive immediately east of North Broadway. A station is proposed to be located between Broadway and the existing driveway causing the angle of the driveway to be slightly modified. This modification would not affect driveway capacity. Therefore, Streetcar Alternative 2 would not have an adverse effect related to Taller San Jose.

The westbound alignment for Streetcar Alternative 1 would pass the Santa Ana Boulevard driveway for 34 Civic Center Plaza. The nearest station would be located approximately 500 feet to the east. There is an existing bus stop closer to the driveway that does not affect driveway access. Since the streetcar station would be further away, it also would not

affect driveway access. Beyond the stations, streetcars would operate in traffic similar to a bus and would not affect driveway access. Therefore, Streetcar Alternative 1 would not have an adverse effect related to driveway access at 34 Civic Center Plaza.

The eastbound alignment of Streetcar Alternative 2 would pass the 5th Street sally port (i.e., secured entryway) for the Ronald Reagan Federal Building and United States Courthouse. There is no station located near the sally port and streetcars would generally flow with traffic past the sally port. Security checks at the sally port may result in passenger vehicle queuing on 5th Street, which is a one way street eastbound. Within this block, there is approximately 450 feet to the west of sally port and 230 feet to the east. The streetcar could be delayed in this queue while the queue of vehicles is cleared entering the building. The streetcar would not be the reason for the queue and would not inhibit access to the sally port. The streetcar would be able to safely pause along this segment without affecting traffic along Ross Street, the north-south arterial to the west end of the block. Similarly, during a red light at the Broadway intersection to the east, the streetcar could pause without blocking the entrance to the federal building. The streetcar would operate in-street, similar to a bus, and the sight lines from the sally port would be maintained after implementation of Streetcar Alternative 2. Therefore, Streetcar Alternative 2 would not have an adverse effect related to the sally port associated with the Ronald Reagan Federal Building and United States Courthouse.

3.10.2.3 IOS-1 and IOS-2

IOS-1 and IOS-2 include the same project features, design options, parking scenarios, and impacts as Streetcar Alternative 1 between Raitt Street and SARTC. The traffic-related differences between the IOS Alternatives and Streetcar Alternatives 1 and 2 are due to the temporary parking lot of approximately 50 spaces at the Raitt Station. The interim lot would be removed once the streetcar system is extended westward to the Harbor Boulevard/Westminster Avenue intersection.

The temporary lot would generate approximately 128 average daily trips. The AM peak hour would include 45 inbound and ten outbound trips. The PM peak hour would include 35 inbound and 25 outbound trips. The proposed site configuration includes access to the interim station parking lot to and from 4th Street and Daisy Avenue. The 4th/Raitt Streets intersection would be configured primarily as an exit only with right-turn only movement in the eastbound direction. Both northbound and southbound traffic along Raitt Street would access the interim station parking lot via 2nd and 3rd Streets to Daisy Avenue.

All roadway segments near the temporary lot would operate at acceptable LOS. However, the unsignalized 3rd/Raitt Streets intersection would operate at a poor LOS under the No Build Alternative. Under IOS-1 and IOS-2, the LOS would be reduced from D to E in the AM peak hour and would remain at F under the No Build Alternative. The poor LOS would primarily affect a low volume of eastbound vehicles on 3rd Street (35 to 50 peak hour vehicles) turning north on Raitt Street or continuing through the intersection on 3rd Street. This localized impact is not considered regionally significant as it would not change the LOS on Raitt Street, which

is a significant roadway in the Study Area. Therefore, IOS-1 and IOS-2 would not result in adverse effects related to intersection LOS.

IOS-2 would affect driveways associated with Austin Hardwoods & Hardware and Taller San Jose. As previously discussed, project implementation would not restrict access to these business. Therefore, Streetcar Alternative 2 would not have adverse effects related driveways.

3.10.3 Measures to Minimize Harm

Operational effects related to traffic and parking would not be adverse. No measures to minimize harm are necessary.

3.10.4 CEQA Determination

3.10.4.1 Significance Criteria and Significance Criteria Application

In accordance with Appendix G of the State CEQA Guidelines, the proposed project would have a significant impact related to traffic and transportation if it would:

- Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including, but not limited to, intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit;
- Conflict with an applicable congestion management program, including, but not limited to, level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways;
- 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;
- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);
- Result in inadequate emergency access; and/or
- Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

No Build Alternative

As discussed in Section 3.10.2.1 above, the No Build Alternative includes existing conditions within the Study Area and adds future planned and funded transit and roadway improvement projects. The No Build Alternative would generally result in continued deterioration of local mobility with falling average travel speeds and increased vehicle miles traveled and vehicle hours traveled in association with future growth in population and jobs. It would also result in greater intersection congestion than existing conditions. Therefore, the No Build Alternative would result in significant impacts related to traffic and transportation.

TSM Alternative

As discussed in Section 3.10.2.1 above, the TSM Alternative emphasizes low-cost improvements and operational efficiencies, such as focused traffic engineering actions, expanded bus service, and improved access to transit services. It may include some minor physical enhancements, such as improvements to transit stop amenities (e.g., bus benches). This would reduce regional congestion and improve local mobility. At the intersection level, the pattern of congestion is similar to the No Build Alternative. However, all study intersections are expected to operate slightly better than the No Build Alternative. This is mostly due to reduction of vehicle trips from the highway system as a result of potential auto trips diverted to improved transit operations. Therefore, the TSM Alternative would result in less-than-significant impacts related to traffic and transportation.

Streetcar Alternatives 1 and 2

Circulation System. As discussed in Section 3.10.2.3 above, all intersections assessed for Streetcar Alternatives 1 and 2 would operate at similar or improved LOS as the No Build Alternative. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to intersection LOS.

A roadway segment capacity analysis was completed because Streetcar Alternatives 1 and 2 would operate in mixed traffic in the central and eastern portion of the Study Area. Streetcar Alternatives 1 and 2 would not cause additional roadway segments to experience capacity deficiencies beyond those identified in the No Build Alternative. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to roadway segments.

As discussed in Section 3.10.2.3 above, grade crossing vehicle activity would not cause excessive vehicle queuing or significantly impact the transportation system given the relatively small number of passenger vehicle and pedestrian activity around stations at the termini or intersection movements at the Harbor Boulevard/Westminster Avenue Station and SARTC. In addition, it is not expected that Streetcar Alternatives 1 and 2 would attract a significant volume of commuters using SARTC as a park-and-ride to access the streetcar system. It is anticipated that streetcar patrons would come primarily from Metrolink and Amtrak, and secondarily from other local and intercity bus services that also utilize SARTC. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to grade crossings and station circulation.

Streetcar Alternatives 1 and 2 would affect access to driveways of four businesses (Table 3.10-8, above). As discussed in Section 3.10.2.3, these businesses either have multiple driveways, and consequently, access would not be affected or effects would be minor and would not interfere with driveway capacity. Also discussed in Section 3.10.2.3, Streetcar Alternative 2 would not significantly interfere with operations of the sally port associated with the Ronald Reagan Federal Building and United States Courthouse. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to driveway access.

Congestion Management Program. As discussed in Section 3.10.2.3, the Harbor Boulevard/ 1st Street intersection, which operates at LOS C in the AM and PM peak hour, is the one CMP intersection within the Study Area. Streetcar Alternatives 1 and 2 would not change the LOS at this intersection. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to the CMP.

Air Traffic Patterns. Streetcar Alternatives 1 and 2 involve improvements to the surface transportation network. The alignment would not connect to an airport, and these alternatives would not cause an increase in air traffic. Therefore, Streetcar Alternatives 1 and 2 would result in no impacts related to air traffic patterns.

Traffic Hazards. Refer to Section 3.15.2.3 below, for a discussion of operational hazards or safety issues, associated with Streetcar Alternatives 1 and 2, including schools and federal buildings. Without mitigation, Streetcar Alternatives 1 and 2 would result in significant traffic hazards related to streetcar and passenger vehicle collisions and pedestrian safety. However, as previously determined, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to bicycle safety hazards.

Emergency Access. Streetcar Alternatives 1 and 2 would maintain existing or equivalent emergency access routes and response times throughout the area by retaining the existing street network and connections. The alignment does not pass in front of a fire station, and station locations would not prohibit access to structures. Streetcar Alternatives 1 and 2 would include construction of the Willowick Station, located between Westminster Avenue and the Santa Ana River, to allow future access when the Willowick Public Golf Course site is developed. Without the development of the Willowick Station, there are no public roadways that cross the proposed alignment within this segment. Emergency access to this one-mile portion of the alignment would be available from Fairview Street on the east and Westminster Avenue on the west. One of the BMPs to be implemented as part of the project would ensure that emergency vehicle and law enforcement access are not impeded by streetcar operations. Additional details about emergency access are described in Sections 3.9.4.1 (Hazards) and 3.15.2.3 (Safety and Security). Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to emergency access.

Public Transit, Bicycle, and Pedestrian Facilities Plans. As a fixed guideway system, Streetcar Alternatives 1 and 2 would facilitate and encourage alternative forms of transportation, including increased use of the local bus system and other transit lines (e.g., Metrolink and Greyhound). Consequently, the project would promote rather than conflict with adopted policies, plans, or programs supporting alternative transportation and would have no impact on alternative transportation modes. Therefore, Streetcar Alternatives 1 and 2 would result in no impact related to public transit, bicycle, and pedestrian facilities plans.

IOS-1 and IOS-2

IOS-1 and IOS-2 include the same project features, design options, and impacts as Streetcar Alternatives 1 and 2 between Raitt Street and SARTC. In addition, the IOS Alternatives would not require emergency access to the PE ROW and would not affect the circulation

system around the Harbor Boulevard/Westminster Avenue Station. Therefore, IOS-1 and IOS-2 would result in less-than-significant impacts related to traffic and transportation.

3.10.4.2 Significance After Mitigation

Impacts related to traffic and transportation were determined to be less than significant. No mitigation measures are required.

3.11 Noise and Vibration

This section provides an overview of noise and vibration and was prepared utilizing the Noise and Vibration Technical Report included as Appendix J. The analysis is based on the affected environment and project features, and evaluates operational impacts associated with the proposed project.

3.11.1 Affected Environment

Noise impact locations along the proposed alignments are identified based on the screening criteria set forth in the FTA Noise and Vibration Impact Assessment Guide. The screening procedure is designed to identify locations where a project may cause noise impacts. Streetcar Alternatives 1 and 2 and the IOS Alternatives are considered a light rail transit system under the screening guidance. Two screening distances were used to identify sensitive receptors: 350 feet from noise source without direct line-of-sight (e.g., intervening buildings) or 175 feet from noise source with direct line-of-sight (e.g., unobstructed). Within the established screening distance, noise sensitive areas that contain similar noise characteristics (i.e., similar noise level variation over the course of the entire day) were grouped and given the same number. **Figures 3.11-1** through **3.11-6** depict the locations of noise sensitive areas (NSAs).

Short- and long-term noise measurements were conducted between June 6, 2011 and June 9, 2011. Long-term measurements were completed over a continuous 24-hour period at representative residential properties. Short-term measurements were completed for at least 20 minutes during daytime hours and 10 minutes during nighttime hours. **Tables 3.11-1** and **3.11-2** include a general description of the land use and location and summarize short- and long-term existing noise monitoring measurements. The existing noise environment is dominated by vehicular traffic.

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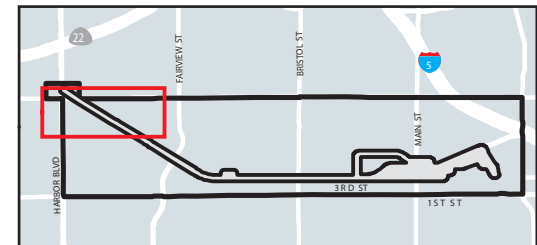
Noise-Sensitive Areas and Sound Level Measurement Locations (NSA-1 and NSA-2)



LEGEND:

Study Area	Noise Sensitive Area
Streetcar Alternative 1 and 2	Short Term Measurement Location
Area of Potential Noise Impact (175-foot Buffer)	Long Term Measurement Location

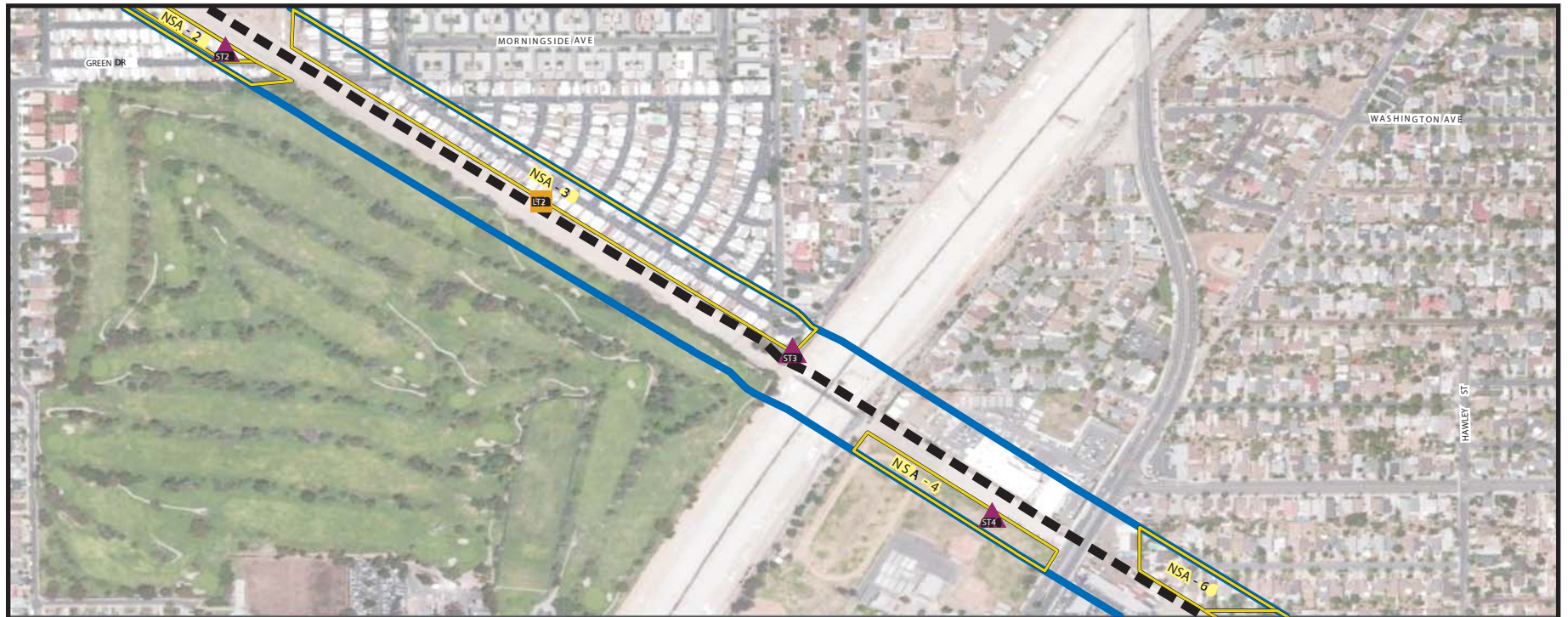
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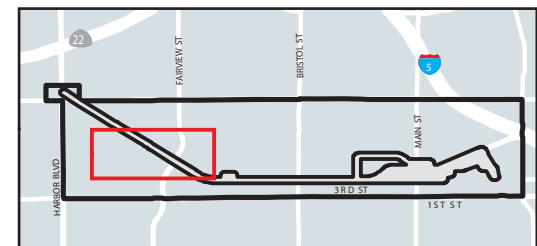
Noise-Sensitive Areas and Sound Level Measurement Locations (NSA-3)



LEGEND:

	Streetcar Alternative 1 and 2		Noise Sensitive Area
	Area of Potential Noise Impact (175-foot Buffer)		Short Term Measurement Location
			Long Term Measurement Location

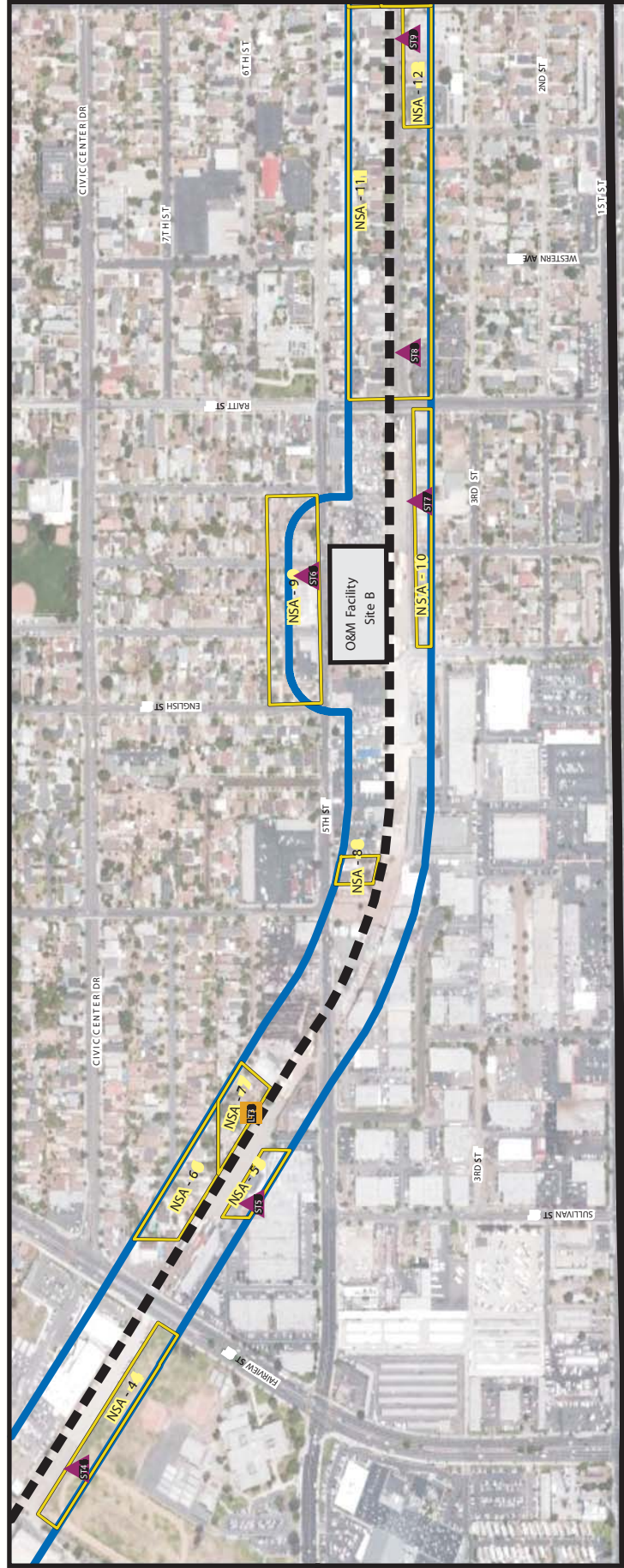
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Noise-Sensitive Areas and Sound Level Measurement Locations (NSA-4 to NSA-10)

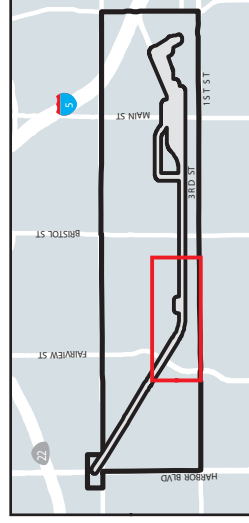


LEGEND:

- Study Area
- Streetcar Alternative 1 and 2
- Area of Potential Noise Impact (175-foot Buffer)
- Noise Sensitive Area
- Short Term Measurement Location
- Long Term Measurement Location

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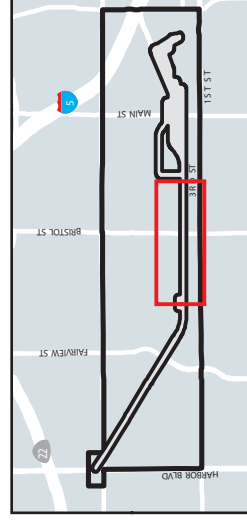
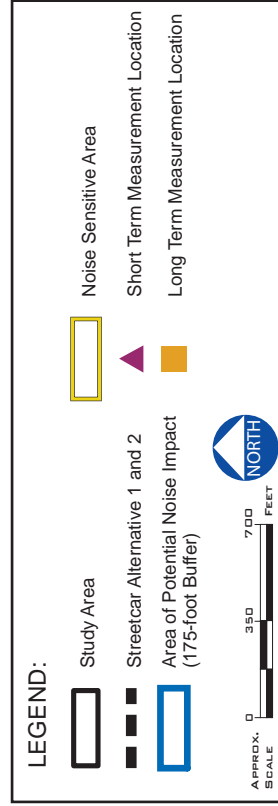


Santa Ana-Garden Grove Fixed Guideway Project

Figure 3.11-4



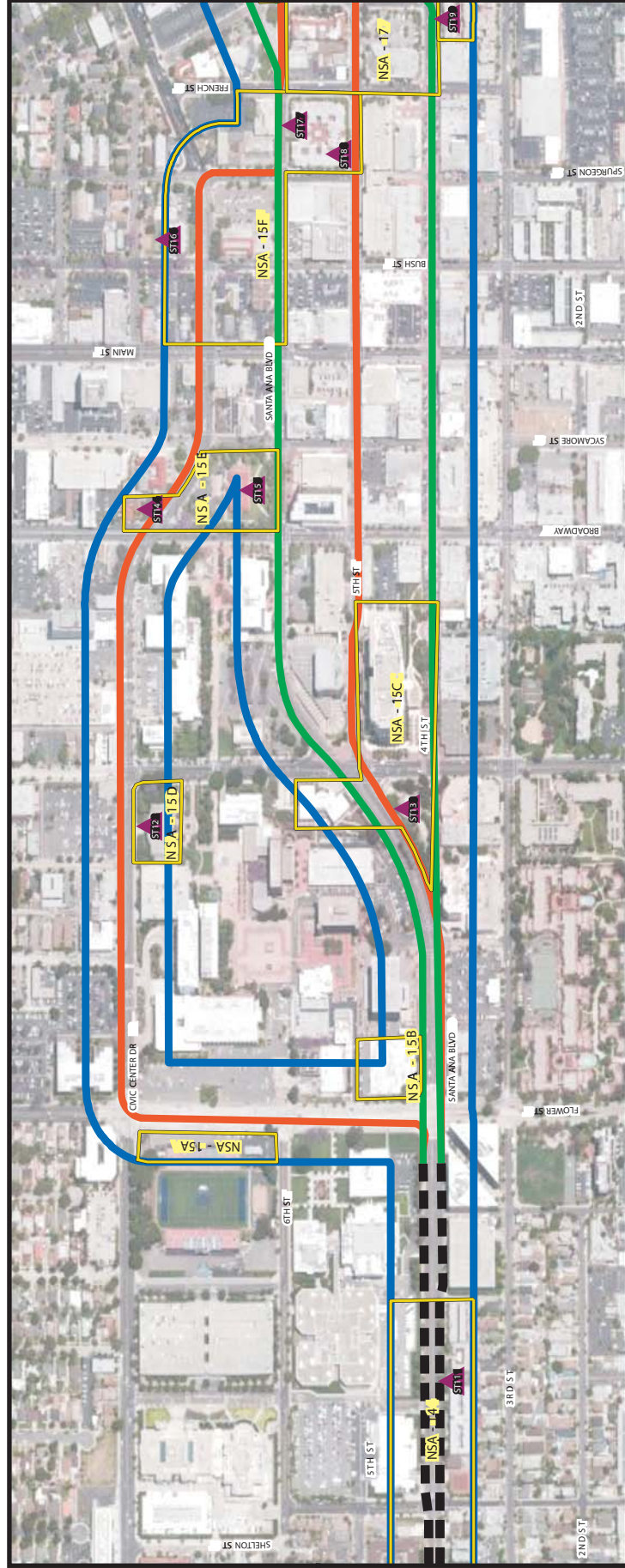
Noise-Sensitive Areas and Sound Level Measurement Locations (NSA-11 to NSA-14)



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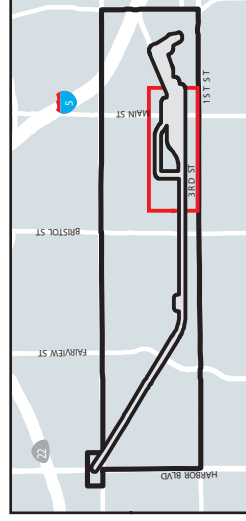
Noise-Sensitive Areas and Sound Level Measurement Locations (NSA-15s)



LEGEND:

- Streetcar Alternatives 1 and 2
- Area of Potential Noise Impact (175-foot Buffer)
- Streetcar Alternative 1
- Noise Sensitive Area
- Streetcar Alternative 2
- Short Term Measurement Location

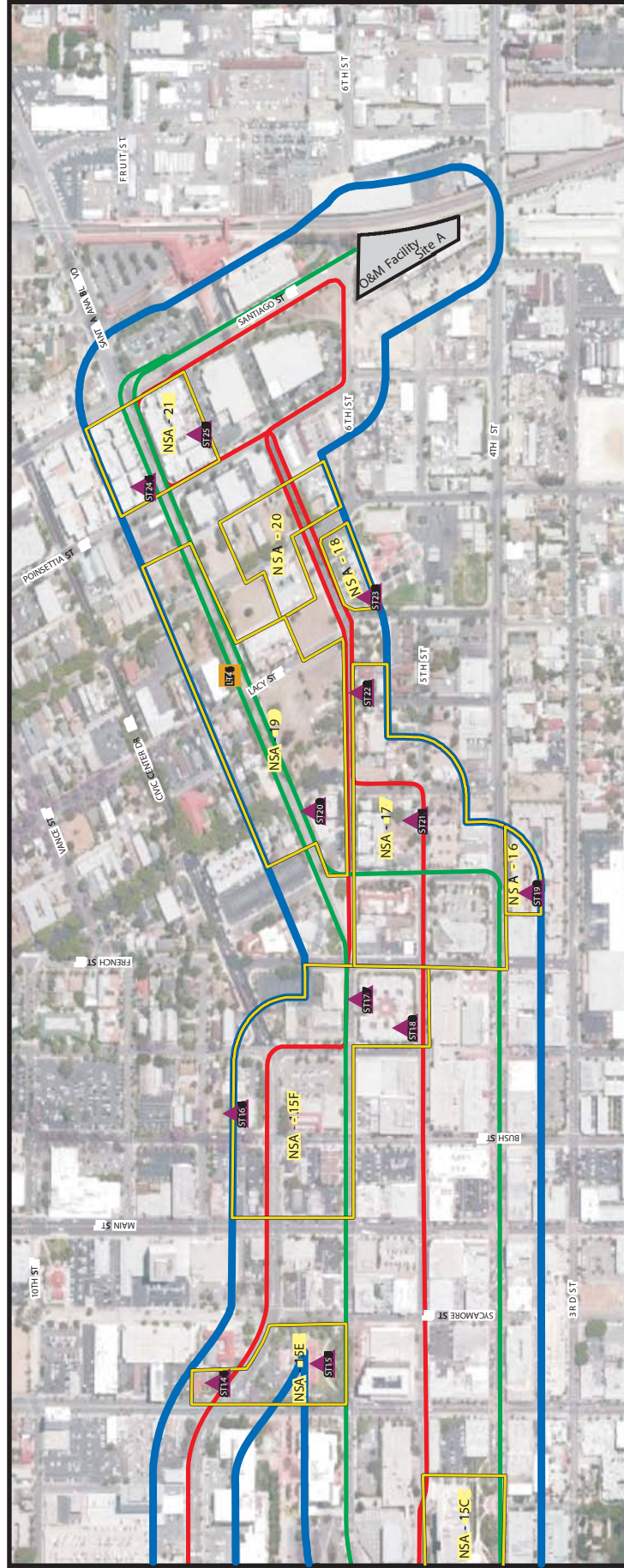
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Noise-Sensitive Areas and Sound Level Measurement Locations (NSA-16 to NSA-21)

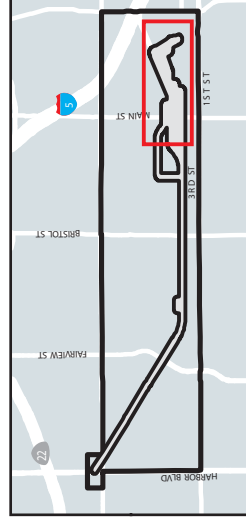


LEGEND:

- Streetcar Alternative 1
- Streetcar Alternative 2
- Area of Potential Noise Impact (175-foot Buffer)
- Noise Sensitive Area
- Short Term Measurement Location

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TABLE 3.11-1: SUMMARY OF SHORT-TERM NOISE MEASUREMENTS

Location	NSA	Description	Sound Level (dBA, Leq)
ST1	NSA-2	24 mobile homes	50
ST2	NSA-2	24 mobile homes	48
ST3	NSA-3	68 mobile homes and one single-family residence	51
ST4	NSA-4	Spurgeon Intermediate School athletic fields. There are no structures within 350 feet of the proposed alignment.	53
ST5	NSA-5	Small Wonders Children's Center, Templo Calvario Assembly of God, and Olive Crest Academy	47
ST6	NSA-9	20 single-family residences and Templo Emanuel Church	51-68
ST7	NSA-10	Four single-family residences	57
ST8	NSA-11	Two apartment buildings and approximately 50 single-family residences	50-58
ST9	NSA-12	Romero-Cruz Elementary School	51-61
ST10	NSA-14	Two apartment buildings and approximately 90 single-family residences	48-57
ST11	NSA-14	Two apartment buildings and approximately 90 single-family residences	53-63
ST12	NSA-15D	Santa Ana Public Library	60
ST13	NSA-15C	California Court of Appeal, Sasser Park, and Ronald Reagan Federal Building and United States Courthouse	62
ST14	NSA-15E	Taller San Jose and Old Courthouse Museum	63
ST15	NSA-15E	Taller San Jose and Old Courthouse Museum	58
ST16	NSA-15F	Four places of worship, one condominium complex, one childcare facility, and six single-family residences	46-52
ST17	NSA-15F	Four places of worship, one condominium complex, one childcare facility, and six single-family residences	65
ST18	NSA-15F	Four places of worship, one condominium complex, one childcare facility, and six single-family residences	54-63
ST19	NSA-16	One apartment complex	45-62
ST20	NSA-19	Four apartment complexes, two places of worship, and approximately ten single-family residences	53-63
ST21	NSA-17	Three apartment complexes and approximately eight single-family residences	56
ST22	NSA-17	Three apartment complexes and approximately eight single-family residence	54
ST23	NSA-18	James A. Garfield Elementary School	57
ST24	NSA-21	One condominium complex	52-67
ST25	NSA-21	One condominium complex	54

Source: URS Corporation, updated by Terry A. Hayes Associates Inc, Noise and Vibration Technical Report, February 2012.

TABLE 3.11-2: SUMMARY OF LONG-TERM NOISE MEASUREMENTS

Location	NSA	Description	Sound Level, dBA		
			Leq(Daytime)	Leq(Nighttime)	Ldn, dBA
LT1	NSA-1	14 single-family residences	51	45	53
LT2	NSA-3	68 mobile homes and one single-family residences	50	43	52
LT3	NSA-7	Four single-family residences	49	41	50
LT4	NSA-9	20 single-family residences	60	53	62

Source: URS Corporation, updated by Terry A. Hayes Associates Inc, Noise and Vibration Technical Report, February 2012.

3.11.2 Environmental Consequences

3.11.2.1 No Build Alternative

The No Build Alternative includes existing conditions within the Study Area and adds future planned and funded transit and roadway improvement projects. Each of these future projects will be environmentally cleared through separate project-specific environmental documentation. Under the No Build Alternative, a streetcar would not be constructed in the Study Area. However, sensitive receivers located near the street system would be affected by changes in mixed-flow traffic.

Traffic studies performed for the No Build Alternative showed that future traffic volumes are forecast to increase between 15 to 20 percent over existing traffic volumes within the Study Area. The future traffic volume increase would correspond to a less than one dBA noise level increase within the Study Area.¹⁹ Therefore, the No Build Alternative would not result in adverse effects related to noise.

Under the No Build Alternative, the streetcar would not operate and there would not be associated vibration. Therefore, the No Build Alternative would not result in adverse effects related to vibration.

3.11.2.2 TSM Alternative

The TSM Alternative emphasizes low-cost improvements and operational efficiencies, such as focused traffic engineering actions, expanded bus service, and improved access to transit services. It may include some minor physical enhancements, such as improvements to transit stop amenities (e.g., bus benches). The expanded bus service would add one or two bus trips per hour to existing routes and approximately 12 bus trips per hour on new routes. These improvements are predicted to result in less than one percent noise level increases to the overall existing traffic. This noise level change is less than one-tenth dBA L_{eq} or L_{dn} when compared to the No Build Alternative.²⁰ Therefore, the TSM Alternative would not result in adverse effects related to noise.

The transit improvements included in the TSM Alternative largely consist of additional bus operations. According to the FTA Noise and Vibration Impact Assessment Guide, the rubber tires provide vibration isolation, and it is unusual for buses to cause vibration problems. Most vibration problems are caused by potholes, bumps, expansion joints, or other discontinuities in the roadway surface. Improvements to the existing and new bus routes would have a smooth roadway surface and buses would travel at slow speeds that would minimize vibration. Furthermore, the projected increase in bus frequency would be minimal and would not alter existing and future vibration levels within the Study Area. It is not anticipated that

¹⁹ The standard unit of measurement for sound is the decibel (dB). The human ear is not equally sensitive to sound at all frequencies. The "A-weighted scale," abbreviated dBA, reflects the normal hearing sensitivity range of the human ear. On this scale, the range of human hearing extends from approximately 3 to 140 dBA.

²⁰ L_{eq} is the average noise level on an energy basis for any specific time period. L_{eq} can be thought of as the level of a continuous noise which has the same energy content as the fluctuating noise level. L_{dn} is a 24-hour L_{eq} with an adjustment to reflect the greater sensitivity of most people to nighttime noise. The adjustment is a 10-dBA penalty for all sound that occurs in the nighttime hours of 10:00 p.m. to 7:00 a.m.

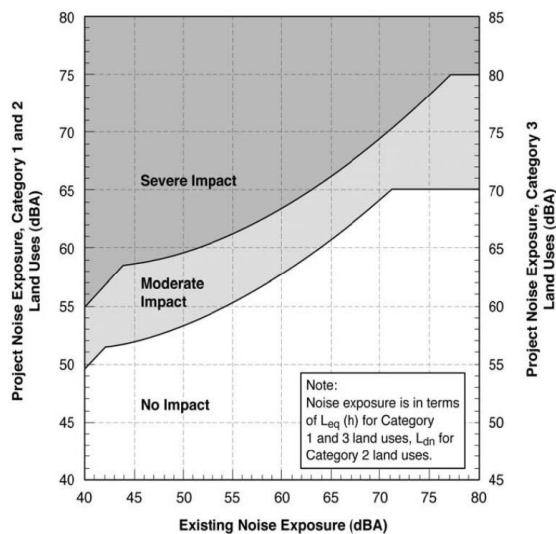
the TSM Alternative would generate perceptible vibration. Therefore, the TSM Alternative would not result in adverse effects related to vibration.

3.11.2.3 Streetcar Alternatives 1 and 2

Noise sources assessed for Streetcar Alternatives 1 and 2 include streetcar operations, transit vehicle warning horns, audible warning devices at gated crossing signals, and operations and maintenance facilities. The primary noise source along most of the alignment is wheel squeal. Streetcars are typically mounted with warning horns that are sounded when approaching the rail/roadway grade crossings where the streetcar is not operating within a mixed-flow environment. In addition to vehicle mounted warning horns, audible warning devices are typically utilized at gated crossing signals.

Noise impacts associated with Streetcar Alternatives 1 and 2 were assessed using the FTA noise impact criteria. **Figure 3.11-7** presents the criteria for FTA’s three degrees of impact – No Impact, Moderate Impact, and Severe Impact. As shown in Figure 3.11-7, the criteria for each degree of impact are on a sliding scale dependent on the existing noise exposure and the project noise exposure.

Figure 3.11-7 Noise Impact Criteria for Transit Projects



Source: FTA, Noise and Vibration Impact Assessment, 2006.

Tables 3.11-3 and 3.11-4 present existing noise levels, predicted noise levels for each noise source, and overall project noise levels at impacted land uses. Each NSA listed in the tables includes multiple housing units that are represented by one or two analyzed receptors. Streetcar Alternatives 1 and 2 would result in severe operational impacts at five different NSA locations. Streetcar Alternative 1 would result in seven moderate impacts and Streetcar Alternative 2 would result in nine moderate impacts. The locations of impacted land uses are shown in **Figures 3.11-8 through 3.11-10**. Therefore, without mitigation, the Streetcar Alternatives 1 and 2 would result in adverse effects related to noise.

TABLE 3.11-3: PROJECTED OPERATIONAL NOISE LEVELS – STREETCAR ALTERNATIVE 1

NSA	Rec.	Land Use Cat./b/	Existing (dBA)	Predicted Project Only Noise Level L _{dn} or L _{eq} (dBA) /a/					Noise Impact Criteria		Project Impact
				Streetcar Operation	Warning Horn	Crossing	O & M Facility	Overall Project Noise	Moderate	Severe	
3	R6	2	52	56	N/A	N/A	N/A	56	55-60	> 60	Moderate
	R7	2	50	57	N/A	N/A	N/A	57	54-59	> 59	Moderate
4	R8	3	52	51	65	50	N/A	66	60-65	> 65	Severe
	R9	3	52	48	63	54	N/A	64	60-65	> 65	Moderate
5	R11	3	46	49	59	43	N/A	59	58-64	> 64	Moderate
6	R10	2	53	56	69	51	N/A	69	55-60	> 60	Severe
7	R12	2	50	57	73	49	N/A	73	54-59	> 59	Severe
8	R13	2	55	56	69	44	N/A	69	55-61	> 61	Severe
9	R15	2	67	N/A	N/A	N/A	66	66	63-67	> 67	Moderate
10	R14	2	58	53	N/A	N/A	63	63	57-62	> 62	Severe
11	R16	2	59	60	N/A	N/A	N/A	60	58-63	> 63	Moderate
17	R56	2	58	60	N/A	N/A	N/A	60	57-62	> 62	Moderate

/a/ L_{dn} is used for Land Use Category 2, whereas L_{eq} is used for Land Use Category 3.

/b/ Land use categories are defined based on FTA.

Category 1 includes or parks where quiet are an essential element of their purpose.

Category 2 includes residences and buildings where people normally sleep. This includes residences, hospitals and hotels, where nighttime sensitivity is assumed to be of utmost importance. Category 3 includes institutional land uses with primarily daytime use that depend on quiet as an important part of operations, including schools, libraries and churches.

Source: URS Corporation, updated by Terry A. Hayes Associates Inc, Noise and Vibration Technical Report, February 2012.

TABLE 3.11-4: PROJECTED OPERATIONAL NOISE LEVELS – STREETCAR ALTERNATIVE 2

NSA	Rec.	Land Use Cat./b/	Existing (dBA)	Predicted Project Only Noise Level L _{dn} or L _{eq} (dBA) /a/					Noise Impact Criteria		Project Impact
				Streetcar Operation	Warning Horn	Crossing	O & M Facility	Overall Project Noise	Moderate	Severe	
3	R6	2	52	56	N/A	N/A	N/A	56	55-60	> 60	Moderate
	R7	2	50	57	N/A	N/A	N/A	57	54-59	> 59	Moderate
4	R8	3	52	51	65	50	N/A	66	60-65	> 65	Severe
	R9	3	52	48	63	54	N/A	64	60-65	> 65	Moderate
5	R11	3	46	49	59	43	N/A	59	58-64	> 64	Moderate
6	R10	2	53	56	69	51	N/A	69	55-60	> 60	Severe
7	R12	2	50	57	73	49	N/A	73	54-59	> 59	Severe
8	R13	2	55	56	69	44	N/A	69	55-61	> 61	Severe
9	R15	2	67	N/A	N/A	N/A	66	66	63-67	> 67	Moderate
10	R14	2	58	53	N/A	N/A	63	63	57-62	> 62	Severe
11	R16	2	59	57	N/A	N/A	N/A	57	58-63	> 63	Moderate
17	R59	2	55	57	N/A	N/A	N/A	57	55-61	> 61	Moderate
19	R70	2	55	59	N/A	N/A	N/A	59	55-61	> 61	Moderate
20	R64	2	55	57	N/A	N/A	49	58	55-61	> 61	Moderate

/a/ L_{dn} is used for Land Use Category 2, whereas L_{eq} is used for Land Use Category 3.

/b/ Land use categories are defined based on FTA.

Category 1 includes or parks where quiet are an essential element of their purpose.

Category 2 includes residences and buildings where people normally sleep. This includes residences, hospitals and hotels, where nighttime sensitivity is assumed to be of utmost importance. Category 3 includes institutional land uses with primarily daytime use that depend on quiet as an important part of operations, including schools, libraries and churches.

Source: URS Corporation, updated by Terry A. Hayes Associates Inc, Noise and Vibration Technical Report, February 2012.

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Noise Impact Assessment (NSA-4 to NSA-10)

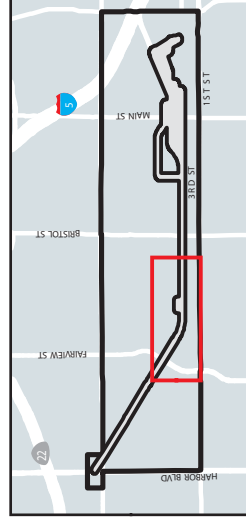


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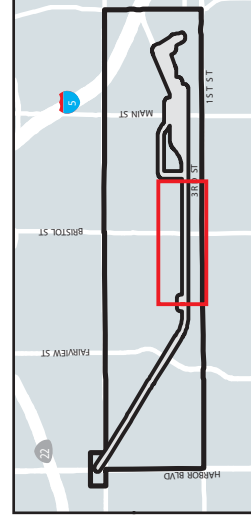
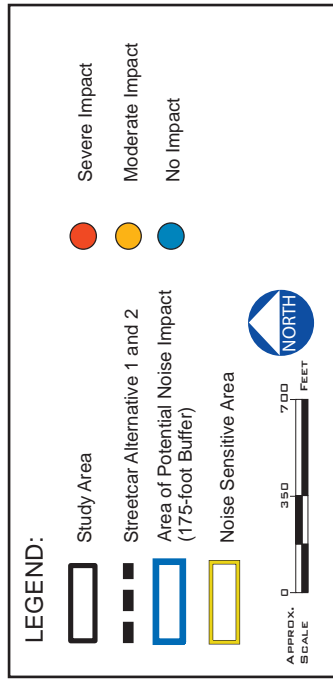
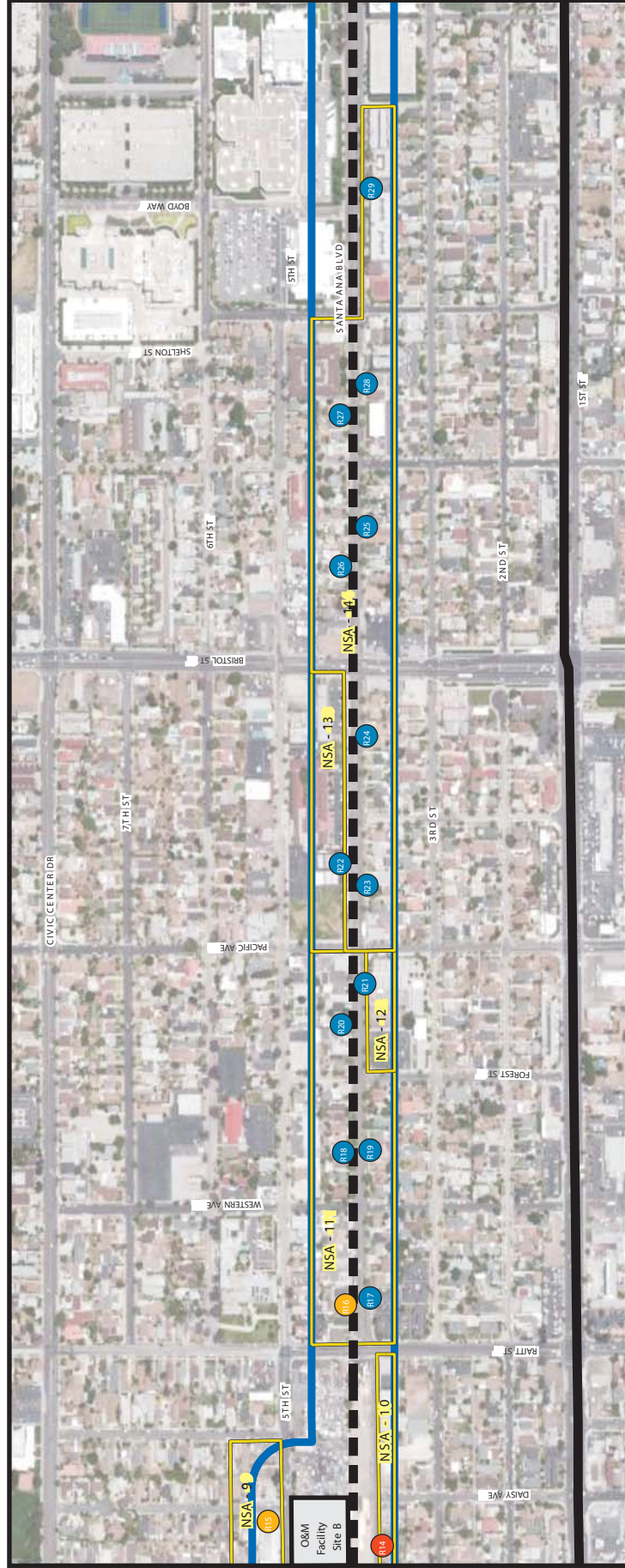
- Study Area
- Streetcar Alternative 1 and 2
- Area of Potential Noise Impact (175-foot Buffer)
- Noise Sensitive Area
- Severe Impact
- Moderate Impact
- No Impact

APPROX. SCALE: 0 350 700 FEET

NORTH



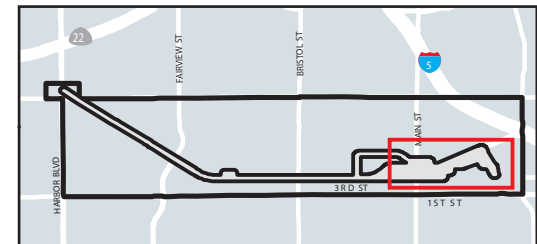
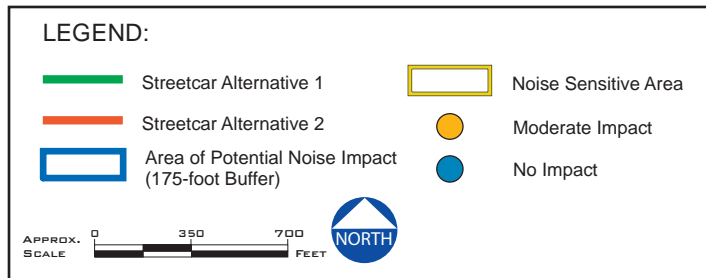
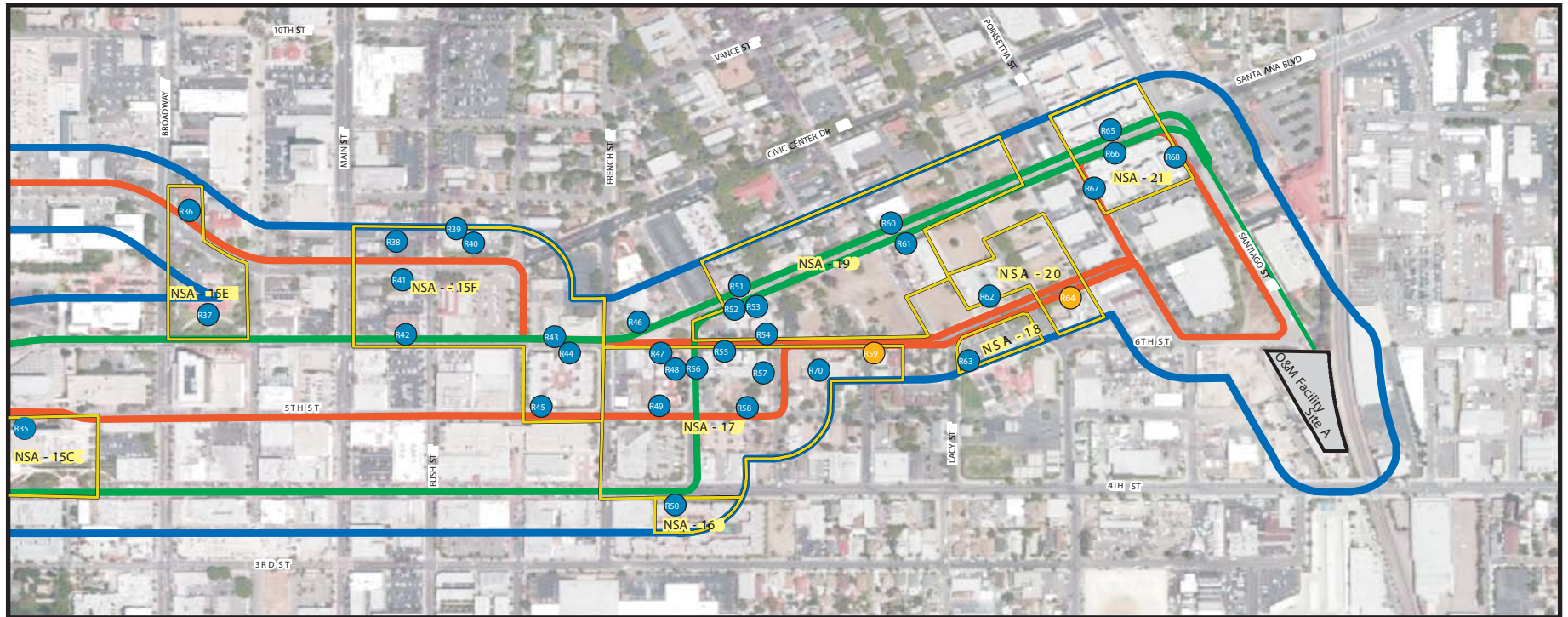
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Noise Impact Assessment (NSA-16 to NSA-21)



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Under Streetcar Alternatives 1 and 2, the impacts at NSA-4 (Spurgeon Intermediate School), NSA-5 (Templo Calvario Assembly of God), NSA-6 (7 housing units), NSA-7 (5 housing units), and NSA-8 (2 housing units) would result from sounding of a warning horn. The impacts at NSA-9 (5 housing units) and NSA-10 (4 housing units) and would result from operation of the O & M Facility. The impacts at NSA-3 (56 housing units), NSA-11 (5 housing units), NSA-17 (6 housing units), NSA-19 (23 housing units and Iglesia La Luz del Mundo Church under Streetcar Alternative 2 only), NSA-20 (1 housing unit under Streetcar Alternative 2 only), and would result from streetcar pass-by noise impact locations. Impact location NSA-4 is bound by Fairview Street, PE ROW, Santa Ana River, and 5th Street. Impact locations NSA-6 through NSA-10 are located between Fairview and Raitt Streets. Impact locations NSA-11, NSA-17, NSA-19, and NSA-20 are located between French Street and SARTC.

Important factors to consider when assessing vibration impacts associated with streetcar operations are maximum streetcar speeds and distances to receivers adjacent to the proposed alignment. **Table 3.11-5** shows vibration thresholds for the three FTA land use categories. For residential land uses, the maximum vibration level, under both Streetcar Alternatives 1 and 2 would be 70 VdB at a streetcar speed of 40 miles per hour and would not exceed FTA vibration impact criteria of 72 VdB. For institutional land uses, the maximum vibration level, under both Streetcar Alternatives 1 and 2 would be 74 VdB at a streetcar speed of 35 miles per hour and would not exceed FTA vibration impact criteria of 75 VdB. Therefore, the Streetcar Alternatives 1 and 2 would not result in an adverse effects related to vibration.

TABLE 3.11-5: CONSTRUCTION VIBRATION ANNOYANCE CRITERIA			
Land Use Category	Vibration Impact Levels (VdB re 1 micro-inch/sec)		
	Frequent Events /a/	Occasional Events /b/	Infrequent Events /c/
Category 1: Buildings where vibration would interfere with interior operations /d/	65	65	65
Category 2: Residences and buildings where people normally sleep	72	75	80
Category 3: Institutional land uses with primarily daytime use	75	78	83

/a/“Frequent Events” is defined as more than 70 vibration events of the same source per day.

/b/“Occasional Events” is defined as between 30 and 70 vibration events of the same source per day.

/c/“Infrequent Events” is defined as fewer than 30 vibration events of the same kind per day.

/d/This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes.

Source: FTA, Transit Noise and Vibration Impact Assessment, May 2006.

3.11.2.4 IOS-1 and IOS-2

The IOS-1 and IOS-2 Alternatives would not include noise or vibration receivers west of the O & M Facility Site B. This would eliminate NSA-1 through NSA-8 and applicable noise impacts. IOS-1 and IOS-2 would result in a severe impact at NSA-10 (4 housing units) and moderate impacts at NSA-9 (5 housing units), NSA-11 (5 housing units), and NSA-17 (6 housing units). In addition, IOS-2 would result in moderate impacts at NSA-19

(10 housing units) and NSA-20 (1 housing unit). Therefore, without mitigation, IOS-1 and IOS-2 would result in adverse effects related to noise.

IOS-1 and IOS-2 would include a temporary parking lot of approximately 50 spaces at the Raitt Station. The interim lot would be removed once the streetcar system is extended westward to the Harbor Boulevard/Westminster Avenue intersection. The parking area would be accommodated by shifting the eastbound tracks a few feet to the north. This would move the alignment further away from the sensitive receptor at NSA-10, which is the most affected by pass-by noise. The minor track modification near NSA-10 would not be affected. Therefore, IOS-1 and IOS-2 would not result in adverse effects related to streetcar pass-by noise at the temporary parking lot.

The temporary parking lot is projected to increase traffic volumes associated with vehicular access to Raitt Station along Daisy Avenue, 3rd Street, and 4th Street. Increased traffic volumes would increase traffic noise. A doubling of traffic volumes would be required to increase noise levels by an audible 3 dBA.²¹ The parking lot would result in approximately 128 trips per day. Existing traffic volumes include 206 trips along Daisy Avenue, 796 trips along 3rd Street, and 1,500 trips along 4th Street. Traffic volumes along 3rd and 4th Streets would not double and mobile source vehicle activity would not audibly increase 24-hour noise levels at receivers along these roadways. Traffic volumes along Daisy Avenue would double and mobile source vehicle activity would audibly increase noise levels at receivers along these roadways. However, this noise level increase would typically only occur during peak hours and would be short-term due to the operation of the temporary parking lot. Therefore, IOS-1 and IOS-2 would not result in adverse effects related to passenger vehicle noise at the temporary parking lot.

Based on the analysis presented for the Streetcar Alternatives, neither IOS-1 nor IOS-2 would result in a vibration impact to sensitive receptors along the alignment between Raitt Street and SARTC. Therefore, the IOS-1 and IOS-2 would not result in adverse effects related to vibration.

3.11.3 Measures to Minimize Harm

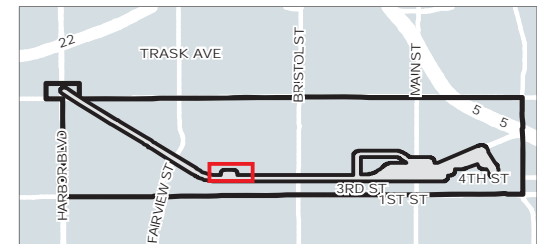
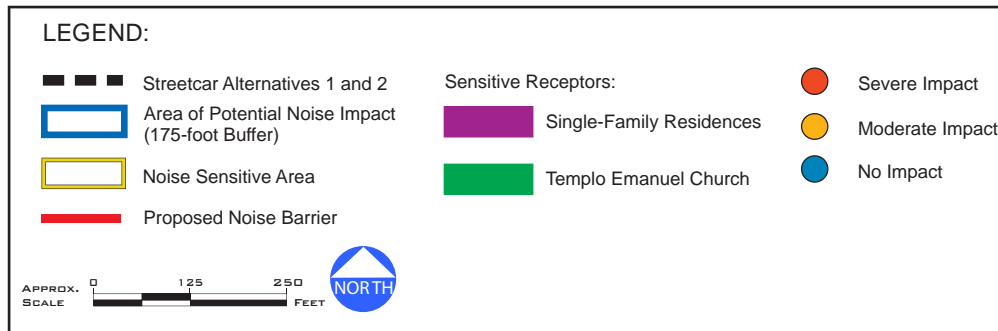
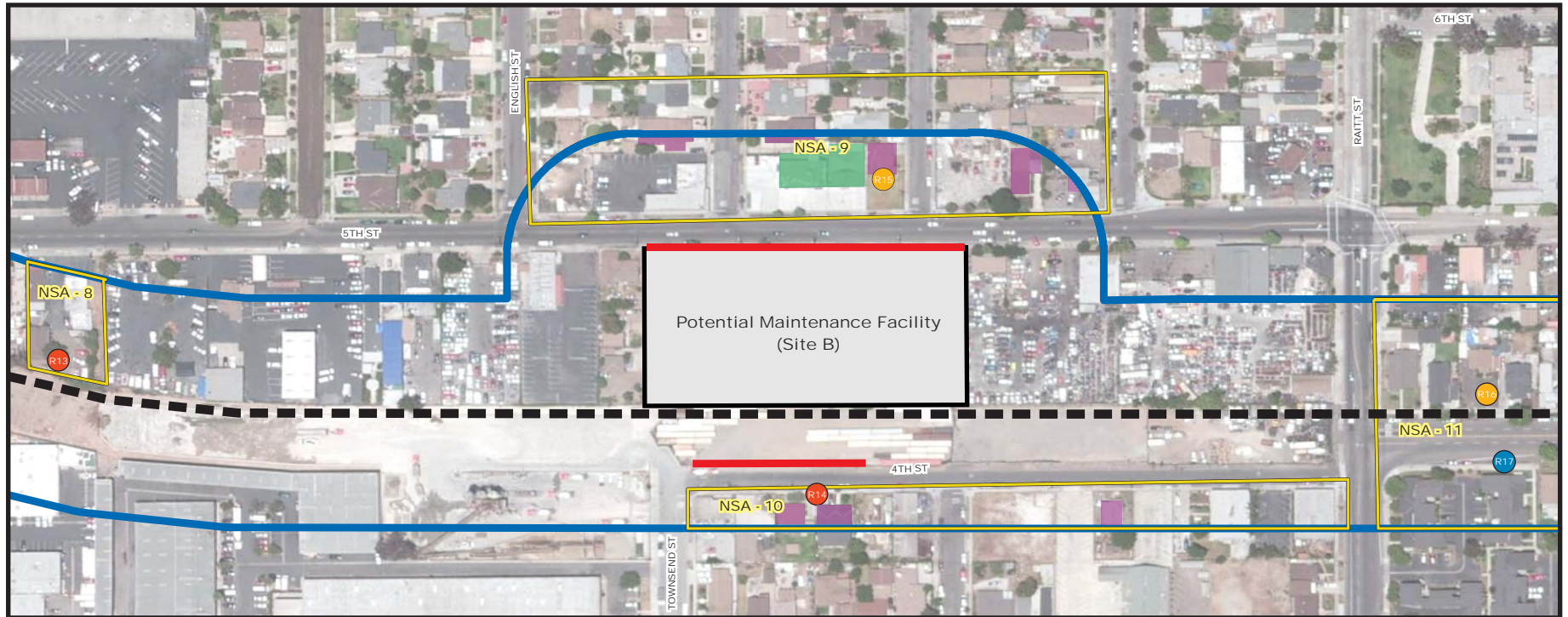
Mitigation Measure **N1** would reduce noise impacts associated with warning horns, Mitigation Measure **N2** would reduce noise impacts associated with streetcar pass-by noise, and Mitigation Measure **N3** would reduce noise impacts at NSA-9 by 5 dBA and NSA-10 by 4 dBA. (**Figure 3.11-11** illustrates the locations of the proposed noise barriers). These mitigation measures would eliminate all potentially severe noise impacts under both the Streetcar and IOS Alternatives. Moderate noise impacts would remain at NSA-6, NSA-7, NSA-8, and NSA-10 under Streetcar Alternatives 1 and 2 and NSA-10 under IOS-1 and IOS-2. However, these impacts would not be considered adverse.

N1 The City of Santa Ana shall request a horn-sounding exemption from the California Public Utilities Commission for the crossing at 5th and Fairview Streets. The exemption

²¹ Caltrans, Technical Noise Supplement, October 1998.



Proposed Noise Barrier



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shall provide justification and demonstrate that safety would not be compromised. In lieu of the warning horn, supplemental safety measures (e.g., four-quad gates, roadway median barriers on grade crossing approaches, and pedestrian gates) would be implemented. If a horn sounding exemption is approved and established, warning horns would not be sounded except under an emergency situation.

- N2** When practical, the contractor shall design special trackwork elements, such as turn-outs, switches, and cross-over to be located at least 600 feet away from sensitive receptors. If this cannot be achieved, then special switch devices, such as spring frogs or movable point frogs shall be utilized. A frog device is used where two rails cross. The frog is designed to ensure the wheel crosses the gap in the rail without “dropping” into the gap.
- N3** If O & M Facility Site B is selected by the City of Santa Ana, the contractor shall construct a noise barrier at the land uses identified as Noise Sensitive Areas 9 and 10. For receptors in Noise Sensitive Area 9, the noise barrier shall be at least 10 feet high and extend for 400 feet along the northern property edge of the proposed operations and maintenance facility. For receptors in Noise Sensitive Area 10, the noise barrier shall be at least 8 feet high and extend for 225 feet along the southern boundary of the PE ROW adjacent to 4th Street. The design of the noise barriers shall be identified on project plans prior to issuance of building permits.

3.11.4 CEQA Determination

3.11.4.1 Significance Criteria and Significance Criteria Application

In accordance with Appendix G of the State CEQA Guidelines, the proposed project would have a significant impact related to noise and vibration if it would:

- Create levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies, or result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- Expose people to or generate excessive groundborne vibration or groundborne noise levels; and/or
- Expose people to excessive airport noise levels.

Local

City of Santa Ana General Plan Noise Element. The Noise Element of the City of Santa Ana General Plan identifies noise standards for interior and exterior environments. The standards are used for planning purposes to establish compatible land uses for noise sensitive developments. As shown in **Table 3.11-6**, the City of Santa Ana has established the following standards and guidelines for noise levels for the different types of land uses.

TABLE 3.11-6: INTERIOR AND EXTERIOR NOISE STANDARDS			
Categories	Land Use Categories	Interior /a/	Exterior (dBA, Leq) /b/
Residential	Single-Family, Duplex, Multi-Family	45 /c/	65
Institutional	Hospital, School Classroom/Playgrounds	45	65
	Church, Library	45	—
Open Space	Parks	—	65

/a/ Interior areas to include but are not limited to: bedrooms, bathrooms, kitchens, living rooms, dining rooms, closets, corridors/hallways, private offices, and conference rooms.

/b/ Exterior areas: private yards of single family homes, park picnic areas, school playgrounds, common areas. Private open space, such as atriums on balconies, shall be excluded from exterior areas provided sufficient common area is included within the project.

/c/ Interior noise level requirements contemplate a closed window condition. Mechanical ventilation system or other means of natural ventilation shall be provided per Chapter 12, Section 1305 of the Uniform Building Code. Source: City of Santa Ana, 1998, Reformatted 2010.

City of Santa Ana Municipal Code. The City of Santa Ana Noise Ordinance includes exterior noise standards, special provisions, and variances for sources of noise within the City. **Table 3.11-7** presents exterior noise standards included in Section 18-312 of the Municipal Code.

TABLE 3.11-7: EXTERIOR NOISE STANDARDS		
Cumulative Period of Greater Than	7:00 a.m. – 10:00 p.m. (dBA, Leq)	10:00 p.m. – 7:00 a.m. (dBA, Leq)
30 Minutes In Any Hour	55	50
15 Minutes In Any Hour	60	55
5 Minutes In Any Hour	65	60
1 Minute In Any Hour	70	65
Anytime	75	70

Source: City of Santa Ana, 1978.

City of Garden Grove General Plan Noise Element. The Noise Element of the City of Garden Grove General Plan identifies compatible noise levels by land uses. **Table 3.11-8** presents the matrix of compatible land uses based on noise levels.

TABLE 3.11-8: NOISE AND LAND USE COMPATIBILITY MATRIX				
Land Use Category	Community Noise Exposure (L_{dn} or CNEL, dBA)			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential - Low Density Single-Family, Duplex, Mobile Homes	50-60	55-70	70-75	75-85
Residential - Multi-Family	50-65	60-70	70-75	70-85
Transient Lodging - Motels Hotels	50-65	60-70	70-80	80-85
Schools, Libraries, Churches, Hospitals, Nursing Homes	50-70	60-70	70-80	80-85
Auditoriums, Concert Halls, Amphitheaters	N/A	50-70	N/A	65-85
Sports Arena, Outdoor Spectator Sports	N/A	50-75	N/A	70-85
Playgrounds, Neighborhood Parks	50-70	N/A	65.5-75	72.5-80
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50-70	N/A	70-80	80-85
Office Buildings, Business Commercial and Professional	50-70	67.5-77.5	75-85	N/A
Industrial, Manufacturing, Utilities, Agriculture	50-75	70-80	75-85	N/A

N/A = Not Applicable

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.

Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.

Normally Unacceptable – New construction or development should 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 should generally not be undertaken. In the event the alleged offensive noise consists entirely of impact noise, simple tone noise, speech, music, or any combination thereof, each of the above noise levels shall be reduced by 5 dBA.

Source: City of Garden Grove, 2008.

City of Garden Grove Municipal Code. The City of Garden Grove Noise Ordinance (Section 8.47) includes ambient base noise levels and special noise sources. Section 8.47.040 of the Noise Ordinance presents ambient base noise levels by land use and time of day, as presented in **Table 3.11-9**.

TABLE 3.11-9: AMBIENT BASE NOISE LEVELS

Land Use Category	Use Designation	Ambient Base Noise Level (dBA, Leq)	Time of Day
Sensitive	Residential Use	55	7:00 a.m. – 10:00 p.m.
		50	10:00 p.m. – 7:00 a.m.
Conditionally Sensitive	Institutional Use	65	Anytime
	Office-Professional Use	65	Anytime
	Hotels and Motels	65	Anytime
Non-Sensitive	Commercial Uses	70	Anytime
	Commercial/Industrial Uses	65	7:00 a.m. – 10:00 p.m.
	within 50 Feet of Residential	50	10:00 p.m. – 7:00 a.m.
	Industrial Use	70	Anytime

Source: City of Garden Grove, 2005.

Under CEQA, the specific noise and vibration impact significance thresholds are left to local jurisdictions to establish. In compliance with Appendix G of the State CEQA Guidelines, the following local noise and vibration thresholds are used to determine a significant impact.

Noise

For sensitive receptors, such as residential land uses, the City of Santa Ana has established an exterior noise standard of 65 dBA. However, according to noise measurements conducted within the Study Area, there are some locations within the vicinity of the proposed alignments with existing noise levels that already exceed this 65 dBA Leq standard. Community noise problems can create a variety of negative effects on residents through loss of sleep, interference with communication, loss of concentration, induced stress, or annoyance. In community noise assessment, a difference of 3dBA is considered a minimal perceptible change, while a 5dBA difference is readily noticeable. Based on this information, the proposed project would have a significant impact related to noise if it would:

- Result in noise level changes of greater than 5 dBA Leq or Ldn; or
- Result in noise level changes between 3 and 5 dBA Leq or Ldn when existing noise levels exceed 65 dBA.

For a consistent analysis of operational noise, the same thresholds have been applied to land uses within the Cities of Santa Ana and Garden Grove.

Vibration

A general assessment was conducted to assess the vibration impacts associated with streetcar operation. Utilizing FTA vibration criteria by land use category, the proposed project would have a significant impact related to noise if it would:

- Result in vibration levels greater than 72 VdB for (residential land uses; and/or
- Result in vibration levels greater than 75 VdB for institutional land uses.

No Build Alternative

As discussed in Section 3.11.2.1 above, the streetcar would not operate under the No Build Alternative. However, sensitive receivers located near the street system would be affected by changes in mixed-flow traffic. Traffic studies performed for the No Build Alternative showed that future traffic volumes are forecast to increase between 15 to 20 percent over existing traffic volumes within the Study Area. The future traffic volume increase would correspond to a less than one dBA noise level increase within the Study Area and a negligible increase in vibration levels. Therefore, the No Build Alternative would result in less-than-significant impacts related to noise and vibration.

TSM Alternative

As discussed in Section 3.11.2.2 above, the TSM Alternative would not involve improvements that would significantly impact existing noise and vibration levels within the Study Area. Impacts associated with bus operations would be minimal and would not alter existing and future noise and vibration levels. According to the FTA Transit Noise and Vibration Impact Assessment guidance document, vibration levels generated by rubber-tired vehicles, including buses, are rarely perceptible. Therefore, the TSM Alternative would result in less-than-significant impacts related to noise and vibration.

Streetcar Alternatives 1 and 2

Noise. Noise sources assessed for Streetcar Alternatives 1 and 2 include streetcar operations, transit vehicle warning horns, audible warning devices at gated crossing signals, and operations and maintenance facilities. The primary noise source along most of the alignment would be wheel squeal. Streetcars are typically mounted with warning horns that are sounded when approaching the rail/roadway grade crossings where the streetcar is not operating within a mixed-flow environment. In addition to vehicle-mounted warning horns, audible warning devices are typically utilized at gated crossing signals. **Table 3.11-10** shows existing noise levels, project-related noise, and combined noise at impacted land uses.

TABLE 3.11-10: STREETCAR ALTERNATIVES 1 AND 2 NOISE LEVELS AT IMPACTED LAND USES						
NSA	Rec.	Land Use Category /a/	Noise Exposure Level in dBA (L _{dn} or L _{eq}) /b/			
			Existing	Streetcar Alternatives	Combined Existing and Streetcar Alternatives	Increase Over Existing
4	R8	3	52	66	66	14
6	R10	2	53	69	69	16
7	R12	2	50	73	73	23
8	R13	2	55	69	69	14
9	R15	2	67	66	70	3

/a/ Land use categories are defined based on FTA. Category 2 includes residences and buildings where people normally sleep. This includes residences, hospitals and hotels, where nighttime sensitivity is assumed to be of utmost importance. Category 3 includes institutional land uses with primarily daytime use that depend on quiet as an important part of operations, including schools, libraries and churches.

/b/ L_{dn} is used for Land Use Category 2, whereas L_{eq} is used for Land Use Category 3.

Source: URS Corporation, updated by Terry A. Hayes Associates Inc, Noise and Vibration Technical Report, February 2012.

Therefore, Table 3.11-10 presents a worst-case noise analysis. Project-related noise levels would exceed the significance thresholds at five noise-sensitive locations. The locations of impacted land uses are shown in Figures 3.11-8 through 3.11-10, above. Under Streetcar Alternatives 1 and 2, the impacts at sensitive receptors NSA-4, NSA-6, NSA-7, and NSA-8 would result from sounding of a warning horn and audible warning devices at gate crossings. The impact at NSA-9 would result from operation of the O & M Facility. Therefore, without mitigation, Streetcar Alternatives 1 and 2 would result in significant impacts related to operational noise levels.

Vibration. As discussed in Section 3.11.2.3 above, vibration levels associated with Streetcar Alternatives 1 and 2 would not exceed the thresholds established by the FTA. Therefore, Streetcar Alternatives 1 and 2 would result in no significant impacts related to vibration.

Airport Noise. The closest public airport within the Study Area is the John Wayne Airport, located approximately four miles to the southeast of the Study Area. The Study Area is not located within the Airport Environs Land Use Plan for John Wayne Airport, published by Orange County in 2008. In addition, the Noise Abatement Program Quarterly Report for 2012 at John Wayne Airport shows that the Study Area is not within the impacted airport noise level contours. Therefore, Streetcar Alternatives 1 and 2 would have no impacts related to airport noise.

IOS-1 and IOS-2

As discussed in Section 3.11.2.4 above, the IOS-1 and IOS-2 Alternatives would not include noise or vibration receivers west of the O & M Facility Site B. This would eliminate noise impact at all noise-sensitive receptors except R15. Therefore, without mitigation, IOS-1 and IOS-2 would result in significant impacts related to streetcar noise.

IOS-1 and IOS-2 would include a temporary parking lot consisting of approximately 50 spaces at the Raitt Station. As discussed in Section 3.11.2.4 above, the parking lot would not generate noise impacts associated with track modifications or on-street passenger vehicle traffic. Therefore, IOS-1 and IOS-2 would result in less-than-significant impacts related to temporary parking lot noise.

Based on the analysis presented for the Streetcar Alternatives, neither IOS-1 nor IOS-2 would result in a vibration impact to sensitive receptors along the alignment between Raitt Street and SARTC. Therefore, the IOS-1 and IOS-2 would result in less-than-significant impacts related to vibration.

3.11.4.2 Significance After Mitigation

Impacts related to noise were determined to be significant without mitigation. Implementation of Mitigation Measures **N1** through **N3**, as identified in Section 3.11.3 above, would reduce the impacts to less than significant.

3.12 Air Quality

This section provides an overview of air quality and was prepared utilizing the Air Quality Technical Report included as Appendix K. The analysis is based on the affected environment and project features, and evaluates operational impacts associated with the proposed project.

3.12.1 Affected Environment

The following criteria air pollutants that are assessed in this section include carbon monoxide (CO), ozone (O₃), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), particulate matter 2.5 microns or less in diameter (PM_{2.5}), particulate matter ten microns or less in diameter (PM₁₀), and lead (Pb). Criteria air pollutants are defined as pollutants for which the federal government has established ambient air quality standards for outdoor concentrations to protect public health. A detailed discussion of the characteristics and health effects of these criteria air pollutants is presented in Appendix K.

The Clean Air Act (CAA) governs air quality in the United States and the U.S. Environmental Protection Agency (USEPA) is responsible for enforcing the CAA. The USEPA is also responsible for establishing the National Ambient Air Quality Standards (NAAQS). The CAA requires the USEPA to designate areas as attainment, nonattainment, or maintenance for each criteria pollutant based on whether the NAAQS have been achieved. A region is a “nonattainment” area if one or more monitoring stations in the region fail to attain the relevant standard. Areas that were previously designated as nonattainment areas but have recently met the standard are called “maintenance” areas. The USEPA has classified the South Coast Air Basin (Basin) as maintenance for CO and nonattainment for O₃, PM_{2.5}, and PM₁₀.

The Study Area is located within the Orange County portion of the Basin. The South Coast Air Quality Management District (SCAQMD) monitors air quality conditions at 49 locations throughout the Basin. The nearest monitoring station to the Study Area is the Anaheim-Pampas Lane Station. Criteria pollutants CO and NO₂ did not exceed the federal standards from 2009 to 2011. The eight-hour federal standard for O₃ was exceeded one time each in 2009 and 2010. The 24-hour federal standard for PM_{2.5} was not exceeded, but the 24-hour federal standard for PM_{2.5} was exceeded five times in 2009 and two times in 2011.

3.12.2 Environmental Consequences

3.12.2.1 No Build Alternative

The No Build Alternative includes existing conditions within the Study Area and adds future planned and funded transit and roadway improvement projects. Each of these future projects will be environmentally cleared through separate project-specific environmental documentation. The streetcar would not operate under this alternative and there would not be related air emissions. Therefore, the No Build Alternative would not result in adverse effects related to air quality.

3.12.2.2 TSM Alternative

The TSM Alternative emphasizes low-cost improvements and operational efficiencies, such as focused traffic engineering actions, expanded bus service, and improved access to transit services. It may include some minor physical enhancements, such as improvements to transit stop amenities (e.g., bus benches). As shown in **Table 3.12-1**, the TSM Alternative would increase vehicle miles traveled (VMT) by approximately 0.5 percent when compared to the No Build Alternative.

TABLE 3.12-1: VEHICLE MILES TRAVELED (2035)			
Project Alternative	VMT	Difference from No Build Alternative	Percent Increase from No Build Alternative
No Build	128,393	0	--
TSM	129,007	614	0.5
Streetcar 1	128,467	74	0.1
Streetcar 2	127,913	(480)	(0.4)
IOS-1	128,467	74	0.1
IOS-2	127,913	(480)	(0.4)

Source: City of Santa Ana, Santa Ana and Garden Grove Fixed Guideway Project Traffic Impact Assessment Report, February 2012.

The slight increase in VMT results from anomalies associated with running the OCTAM within a small Study Area as opposed to county-wide. Regionally, it is anticipated that the TSM Alternative would reduce VMT when compared to the No Build Alternative. The 0.5 percent VMT increase would have negligible effects on air quality, odors, and greenhouse gas (GHG) emissions (approximately 90 metric tons of carbon dioxide equivalent (CO₂e) per year). Therefore, the TSM Alternative would not result in adverse effects related to air quality.

3.12.2.3 Streetcar Alternatives 1 and 2

The air quality analysis includes an assessment of criteria pollutant emissions, localized pollutant concentrations, air toxics, odors, GHGs and transportation conformity. The analysis of these issues is similar for Streetcar Alternatives 1 and 2 and the associated options.

Criteria Pollutant Analysis

Streetcar Alternatives 1 and 2 would enhance connectivity between neighborhoods, business, and activity centers in central Santa Ana and Garden Grove. The proposed streetcar alignments will extend Metrolink to Orange County’s historic urban core, transferring riders directly from SARTC to key activity centers in the Cities of Santa Ana and Garden Grove. It is anticipated that implementation of either Streetcar Alternative 1 or 2 would reduce automobile dependency.

As shown in Table 3.12-1, Streetcar Alternative 1 would increase VMT by approximately 0.1 percent when compared to the No Build Alternative. The slight increase in VMT results from inconsistencies associated with running the Orange County Transportation Analysis Model within a small Study Area as opposed to county-wide. It is anticipated that regionally the Streetcar Alternative 1 would reduce VMT when compared to the No Build Alternative.

The 0.1 percent VMT increase would result in negligible impacts to air quality. Therefore, Streetcar Alternative 1 would not result in adverse effects related to criteria pollutant emissions.

As shown in Table 3.12-1, above, Streetcar Alternative 2 would decrease VMT by approximately 0.4 percent when compared to the No Build Alternative. The 0.4 percent VMT decrease would result in negligible impacts to air quality. Therefore, Streetcar Alternative 2 would not result in adverse effects related to criteria pollutant emissions.

Localized Concentrations

Electrically-powered streetcars would not generate localized exhaust emissions. Changes to intersection operations as a result of streetcar activity could potentially increase vehicle idling and result in CO hotspots. A CO hotspot analysis was completed for the following congested intersections:

- Westminster Avenue/Harbor Boulevard
- Fairview Street/Civic Center Drive
- Santa Ana Boulevard/Raitt Street
- Flower Street/Civic Center Drive
- Civic Center Drive/Parton Street
- Civic Center Drive/Spurgeon Street
- Santa Ana Boulevard/Lacy Street

The analysis indicated that future one-hour CO concentrations would range from 6.0 to 6.4 parts per million (ppm) and eight-hour CO concentrations would range from 4.0 to 4.3 ppm. In addition, the proposed park-and-ride facility located on the northeast corner of the Harbor Boulevard/Westminster Avenue intersection would potentially increase localized pollutant concentrations. The parking facility would generate approximately 130 passenger vehicle trips per day. This would generate less than 0.1 ppm for one- and eight-hour CO concentrations. CO concentrations associated with intersection and parking activity would be less than the federal one- and eight-hour CO standards of 35 and 9 ppm. Therefore, Streetcar Alternatives 1 and 2 would not result in an adverse effect related to localized concentrations.

Air Toxics

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendment (CAAA) of 1990, whereby Congress mandated that the USEPA regulate 188 air toxics, also known as hazardous air pollutants. Among the USEPA expansive list of compounds that are on the national and regional-scale cancer risk are acrolein, benzene, 1,3-butadiene, diesel particulate matter plus diesel exhaust organic gases, formaldehyde, naphthalene, and polycyclic organic matter. Electrically-powered streetcars would not generate localized exhaust emissions. Streetcar Alternatives 1 and 2 have no potential to generate meaningful mobile source air toxics (MSAT) emissions.

O & M Facility Site A or B would service streetcar vehicles and would require the use of solvents and related chemicals for cleaning and repair activities. The activities at the O & M

Facility would be identical under Streetcar Alternatives 1 and 2. The California Air Resources Board (CARB) has published guidance for locating pollutant generators near sensitive populations.²² The recommendations include guidance on locating sensitive populations near sources of diesel emissions, chrome plating, dry cleaners, and gasoline-dispensing facilities. Neither O & M Facility Site A nor B would generate diesel emissions or be a substantial source of chemicals identified in the CARB guidance. Therefore, Streetcar Alternatives 1 and 2 would not result in an adverse effect related to air toxics.

Odors

Streetcar activity would not generate odors. However, O & M Facility Site A or B would require the use of solvents and related chemicals for cleaning and repair activities. These sources would not be used in sufficient quantities that would emit substantial odors for public complaints. Therefore, Streetcar Alternatives 1 and 2 would not result in an adverse effect related to odors.

Greenhouse Gas Emissions

The Council on Environmental Quality has provided a draft guidance memorandum on the ways in which federal agencies can improve their consideration of the effects GHG emissions in NEPA documents. The guidance states that direct emissions from a proposed action of 25,000 metric tons per year of CO_{2e} can be used as indicator that a quantitative and qualitative assessment may be meaningful to decision makers. GHG emissions generated during operation of Streetcar Alternatives 1 and 2 would be associated with electricity consumption by the proposed streetcars and changes in VMT for each streetcar alternatives compared to the No Build Alternative. GHG emissions associated with Streetcar Alternatives 1 and 2 would be approximately 1,224 and 1,144 metric tons of CO_{2e} per year, respectively, and would not exceed the 25,000 metric tons of CO_{2e} per year value indicating a more detailed analysis is necessary. Therefore, Streetcar Alternatives 1 and 2 would not result in an adverse effect related to GHG emissions.

Transportation Conformity

Transportation conformity is required under CAA Section 176(c) (42 U.S.C. §7506(c)) to ensure that federally supported highway and transit project activities are consistent with the purpose of the State Implementation Plan (SIP). Conformity to the purpose of the SIP means that transportation activities will not cause new air quality violations, worsen existing violations, or delay timely attainment of the relevant NAAQS. The USEPA's transportation conformity rule (40 CFR 51.390 and Part 93) establishes the criteria and procedures for determining whether transportation activities conform to the SIP. Under the criteria, transportation projects must demonstrate conformity on regional and local levels.

Regional conformity for a given project is analyzed by discussing if the proposed project is included in a conforming Regional Transportation Plan (RTP) or Transportation Improvement Plan (TIP) with substantially the same design concept and scope that was used for the regional conformity analysis. Project-level conformity is analyzed by discussing if the

²² CARB, Air Quality and Land Use Handbook: A Community Health Perspective, April 2005.

proposed project would cause localized exceedances of CO, PM_{2.5}, and/or PM₁₀ standards, or it would interfere with “timely implementation” of Transportation Control Measures called out in the SIP.

Regional Conformity

The proposed project is fully funded and included in the 2012-2035 RTP/SCS, which was found to conform to the SIP by the SCAG on April 4, 2012. The Federal Highway Administration and FTA adopted air quality conformity findings on June 4, 2012. The proposed project is listed in the adopted 2011 TIP under the Project ID ORA080909. The description of the project within the TIP is “A Project Study for the City of Santa Ana – Fixed Guideway System linking the SARTC to Harbor Boulevard in the City of Garden Grove” and is classified as exempt from conformity analysis. However, based on 42 U.S.C. §7506(c)(2)(C)(ii), the design concept and scope of a project cannot change substantially since the conformity finding regarding the plan. The proposed project should no longer be classified as a “Project Study” in the TIP because the project sponsor is seeking funding for construction. An amendment to the TIP is necessary to revise the project description to reflect project implementation.

Local Conformity

Carbon Monoxide. The procedure for determining CO conformity in California is detailed in the Transportation Project-Level Carbon Monoxide Protocol developed by the Institute of Transportation Studies at the University of California, Davis. The Protocol was approved by the USEPA in October of 1997.²³ Figure 3 in the Protocol lists project conditions that result in no further CO analysis. These conditions include no significant increase in cold starts, no significant increase in intersection volumes, improved traffic flow, and no roadway realignment that moves a source closer to a receptor site. The proposed project complies with each of these conditions and a CO analysis related to transportation conformity is not required.

Particulate Matter. Qualitative particulate matter hotspot analysis is required under the USEPA Transportation Conformity rule for Projects of Air Quality Concern (POAQC). Projects that are not POAQC are not required to complete a detailed particulate matter hotspot analysis. According to the USEPA Transportation Conformity Guidance, the following types of projects are considered POAQC:

- New or expanded highway projects that have a significant number of or significant increase in diesel vehicles (defined as greater than 125,000 Annual Average Daily Traffic (AADT) and eight percent or more of such AADT is diesel truck traffic)
- Projects affecting intersections that are at a LOS D, E, or F with a significant number of diesel vehicles, or that that will change to LOS D, E, or F, because of increased traffic volumes from a significant number of diesel vehicles related to the project
- New bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location

²³ CARB, Transportation Project-Level Carbon Monoxide Protocol, December 1997.

- Expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location
- Projects in or affecting locations, areas, or categories of sites which are identified in the PM_{2.5} or PM₁₀ implementation plan or implementation plan submission, as appropriate, as sites of possible violation

The proposed project is not considered a POAQC because it does not meet the definition of a POAQC as defined in the USEPA's Transportation Conformity Guidance. The proposed project would not increase the percentage of diesel vehicles on the roadway, would not involve a bus or rail terminal that significantly increases diesel vehicles, and is not identified in the SIP as a possible PM_{2.5} or PM₁₀ violation site. Operational activity would not generate diesel emissions. The proposed project has undergone Interagency Consultation and participants concurred on July 24, 2012 that it is not a POAQC. A particulate matter hotspot analysis is not required.

3.12.2.4 IOS-1 and IOS-2

Operation of IOS-1 and IOS-2 would result in similar air quality conclusions as discussed for localized pollutant concentrations, air toxics, and transportation conformity under Streetcar Alternatives 1 and 2. There are no operational differences from Streetcar Alternatives 1 and 2 that would affect air quality other than changes to the VMT associated with the shorter alignments and the addition of an interim parking lot. As shown in Table 3.12-1, above, IOS-1 would increase VMT by approximately 0.1 percent when compared to the No Build Alternative. IOS-2 would decrease VMT by approximately 0.4 percent when compared to the No Build Alternative. These VMT differences would result in negligible impacts to air quality. GHG emissions associated with IOS-1 and IOS-2 would be similar to the emissions presented for Streetcar Alternatives 1 and 2 and would be less than the 25,000 metric tons of CO_{2e} per year value, indicating that a more detailed analysis is not necessary. IOS-1 and IOS-2 would include an interim parking station on the west side of the Raitt Street/Santa Ana Boulevard intersection. The interim station parking would generate approximately 130 daily trips (approximately 10 to 15 peak hour trips). This interim station parking lot is not anticipated to cause additional roadway segments to experience capacity deficiency and no adverse effects are expected on the surrounding area or the adjacent streets. This would generate less than 0.1 ppm for one- and eight-hour CO concentrations. CO concentrations associated with intersection and parking activity would be less than the federal one- and eight-hour CO standards of 35 and 9 ppm, respectively. Therefore, IOS-1 and IOS-2 would not result in an adverse effect related to air quality.

3.12.3 Measures to Minimize Harm

Operational effects related to air quality would not be adverse. No mitigation measures are required.

3.12.4 CEQA Determination

3.12.4.1 Significance Criteria and Significance Criteria Application

In accordance with Appendix G of the State CEQA Guidelines, the proposed project would have a significant impact related to air quality if it would:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations;
- Create objectionable odors affecting a substantial number of people;
- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; and/or
- Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs.

The SCAQMD has developed specific CEQA significance thresholds to assess operational air quality impacts. Projects that generate emissions that are less than these thresholds would not contribute to an existing or projected air quality violation. Streetcar Alternatives 1 and 2 would have a significant impact related to operational air quality if daily operational emissions were to exceed SCAQMD operational emissions thresholds for VOC, NOX, CO, SOX, PM_{2.5}, or PM₁₀, as presented in **Table 3.12-2**.

TABLE 3.12-2: SCAQMD DAILY OPERATIONAL EMISSIONS THRESHOLDS	
Criteria Pollutant	Pounds Per Day
Volatile Organic Compounds (VOC)	55
Nitrogen Oxides (NOX)	55
Carbon Monoxide (CO)	550
Sulfur Oxides (SOX)	150
Fine Particulates (PM _{2.5})	55
Particulates (PM ₁₀)	150

Source: SCAQMD, 2012.

GHG significance thresholds have not been formally adopted on the regional or local level. The GHG analysis follows the guidance in SCAQMD's draft guidance document, Interim CEQA Greenhouse Gas (GHG) Significance Thresholds. The interim GHG significance thresholds are based on a sequential five-tiered decision tree, as follows:

- **Tier 1.** Consists of evaluating whether or not the project qualifies for any applicable exemption under CEQA.

- **Tier 2.** Consists of determining whether or not the project is consistent with the GHG reduction plan. The GHG reduction plan must, at a minimum, comply with AB 32 GHG reduction goals; include emission estimates agreed upon by either CARB or the SCAQMD that have been analyzed under CEQA; and have a certified final CEQA document. The GHG reduction plan must include a GHG emissions inventory tracking mechanism to monitor progress in achieving GHG emission reduction targets and a commitment to remedy the excess emissions if AB 32 goals are not met.
- **Tier 3.** Attempts to identify small projects that would not likely contribute to significant cumulative GHG impacts. In addition, Tier 3 includes requirement that all residential/commercial projects with GHG emissions include efficiency components that reduce emissions beyond the requirements of Title 24 (Part 6, California Code of Regulations), California's energy efficiency standards for residential and nonresidential buildings. The project proponent would also have to reduce, by a specified percentage, electricity demand from water use, primarily electricity used for water conveyance.

The following are the screening levels below which less-than-significant impacts would occur:

- 10,000 metric tons CO₂e for industrial uses
- 3,000 metric tons CO₂e for commercial and residential uses
- **Tier 4.** Consists of three options to demonstrate that a project is not significant for GHG emissions.
 - *Compliance Option 1.* The lead agency would calculate GHG emissions for projects using a business-as-usual (BAU) methodology. Once GHG emissions are calculated, the project proponent would need to incorporate design features into the project and/or implement GHG mitigation measures to demonstrate a 30-percent reduction from BAU.
 - *Compliance Option 2.* This compliance option consists of early compliance with AB 32 implementation of CARB Scoping Plan Measures.
 - *Compliance Option 3.* This compliance option consists of establishing sector-based performance standards. If the lead agency or project proponent cannot achieve the performance standards on any of the compliance options for Tier 4, GHG emissions would be considered significant.
- **Tier 5.** Under this tier, the lead agency would quantify GHG emissions from the project, and the project proponent would implement off-site mitigation or purchase offsets to reduce GHG emissions impacts to less than the proposed screening level. In addition, the project proponent would be required to provide offsets for the life of the project, which is defined as 30 years. If the project proponent is unable to obtain sufficient offsets, incorporate design features, or implement GHG reduction mitigation measures to reduce GHG emission impacts to less than the screening level, then GHG emissions from the project would be considered significant.

Based on the interim GHG significance thresholds, Tier 3 would be applicable to the proposed project. An annual screening limit of 10,000 metric tons CO₂e for industrial uses shall be used for determining GHG impacts.

No Build Alternative

As discussed in Section 3.12.2.1 above, the streetcar would not operate under the No Build Alternative, and consequently, there would not be related effects on air quality or GHG emissions. Therefore, the No Build Alternative would have no impacts related to air quality.

TSM Alternative

Criteria Pollutant Emissions. As discussed in Section 3.12.2.2 above, TSM Alternative would not involve construction of major new transportation facilities or physical capacity improvements, but would instead focus on low-cost, small physical improvements and operational efficiencies. Air pollutant emissions generated during operation of TSM Alternative would be associated with the changes in air pollution generated by changes in VMT compared to No Build Alternative. Mobile source emissions were estimates using EMFAC2011. **Table 3.12-3** shows that VMT-related operational emissions associated with TSM Alternative would be a less than one-pound per day difference from emissions under the No Build Scenario. The net difference in emissions would be negligible and would not exceed the SCAQMD significance thresholds. In addition, it is anticipated that the TSM Alternative would improve traffic flow on surface streets, and would not generate a localized CO hotspot.

TABLE 3.12-3: OPERATIONAL EMISSIONS – TSM ALTERNATIVE							
Project Alternative	VMT	Pounds Per Day					
		CO	NOX	TOG	SO ₂	PM ₁₀	PM _{2.5}
No Build	128,393	181	15	5	< 1	1	1
TSM	129,007	182	15	5	< 1	1	1

Source: Terry A. Hayes Associates Inc., 2012.

Therefore, the TSM Alternative would result in less-than-significant impacts related to regional operational emissions.

Greenhouse Gas Emissions. GHG emissions generated during operation under the TSM Alternative would be associated with changes in air pollution generated by changes in VMT and amortized construction emissions. **Table 3.12-4** presents the total GHG which include both operational emissions and construction emissions amortized over a 30-year time frame to obtain annual emissions. GHG emissions associated with the TSM Alternative would be approximately 90 metric tons of CO₂e per year and would not exceed the SCAQMD's GHG significance threshold of 10,000 metric tons of CO₂e per year. Therefore, the TSM Alternative would result in less-than-significant impacts related to GHG emissions.

TABLE 3.12-4: GREENHOUSE GAS EMISSIONS – TSM ALTERNATIVE	
Scenario and Source	GHG (Metric Tons Per Year)
TSM ALTERNATIVE VS. NO BUILD	
Mobile	89
Construction	1
Total	90
SCAQMD THRESHOLDS	10,000
Exceeds the Significance Threshold?	No

Source: Terry A. Hayes Associates Inc., 2012.

Streetcar Alternatives 1 and 2

Air Quality Management Plan (AQMP). A consistency determination plays an important role in local agency project review by linking local planning and individual projects to the AQMP. It fulfills the CEQA goal of informing decision makers of the environmental efforts of a project under consideration at an early enough stage to ensure that air quality concerns are fully addressed. It also provides the local agency with ongoing information as to whether they are contributing to clean air goals contained in the AQMP.

Locally, Streetcar Alternatives 1 and 2 are part of the City of Santa Ana's Transit Vision, which is focused on providing transportation and air pollution reduction through development and improvement of mass transit facilities. The principal components of this transit vision include a streetcar project, as well as the SARTC Master Plan, and are also supported by the Transit Zoning Code and the Station District Plan. In addition, Air Quality Implementation Program in the City of Garden Grove Air Quality Element of the General Plan states that Garden Grove should work closely with OCTA and adjacent cities to establish an alternative transportation system along the OCTA right-of-way, such as the "Go Local" program on the right-of-way between Garden Grove and Santa Ana. Consequently, Streetcar Alternatives 1 and 2 are consistent with the Cities of Santa Ana and Garden Grove long-term visions for transportation development and traffic congestion alleviation.

Regionally, Streetcar Alternatives 1 and 2 would connect the Cities of Santa Ana and Garden Grove to the SARTC facility. The development of mass transit infrastructure is a Transportation Control Measure (TCM) in the AQMP that seeks to reduce air pollutant emissions via a reduction in vehicle trips and congestion. Consequently, these alternatives are consistent with the TCM in the AQMP. Streetcar Alternatives 1 and 2 are included within SCAG 2012-2035 RTP/SCS, adopted on April 4, 2012, as well as the Federal Transportation Improvement Plan. The Federal Highway Administration and FTA adopted air quality conformity findings on June 2, 2012. The proposed project is listed in the adopted 2011 Federal Transportation Program under the Project ID ORA080909.

In summary, Streetcar Alternatives 1 and 2 are consistent with the transportation and air quality goals of the City of Santa Ana's Transit Vision, the City of Garden Grove's General Plan, and the AQMP. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to consistency with air quality management plans.

Air Quality Standards. Air pollutant emissions generated during operation of Streetcar Alternatives 1 and 2 would be associated with the changes in VMT. Mobile source emissions were estimated using EMFAC2011. **Table 3.12-5** shows that VMT-related operational emissions associated with Streetcar Alternatives 1 and 2 would be a less than one pound per day difference from emissions under the No Build Alternative. The net difference in emissions would be negligible and would not exceed the SCAQMD significance thresholds. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to regional operational emissions.

TABLE 3.12-5: OPERATIONAL EMISSIONS – STREETCAR ALTERNATIVES

Project Alternative	VMT	Pounds Per Day					
		CO	NOX	TOG	SO ₂	PM ₁₀	PM _{2.5}
No Build	128,393	181	15	5	< 1	1	1
Streetcar 1	128,467	181	15	5	< 1	1	1
Streetcar 2	127,913	181	15	5	< 1	1	1

Source: Terry A. Hayes Associates Inc., 2012.

Pollutant Concentrations. The proposed project would include electrically-powered streetcars and would not generate localized exhaust emissions. Changes to intersection operations as a result of project implementation could potentially increase vehicle idling and result in CO hotspots. A CO hotspot analysis was completed for the following congested intersections that would worsen to LOS D, E, or F with the implementation of either Streetcar Alternative 1 or 2:

- Westminster Avenue/Harbor Boulevard
- Fairview Street/Civic Center Drive
- Santa Ana Boulevard/Raitt Street
- Flower Street/Civic Center Drive
- Civic Center Drive/Parton Street
- Civic Center Drive/Spurgeon Street
- Santa Ana Boulevard/Lacy Street

The analysis indicated that future one-hour CO concentrations would range from 6.0 to 6.4 ppm and eight-hour CO concentrations would range from 4.0 to 4.3 ppm. In addition, the proposed park-and-ride facility located on the northeast corner of the Harbor Boulevard/Westminster Avenue intersection would potentially increase localized pollutant concentrations. The parking facility would generate approximately 130 passenger vehicle trips per day. This would contribute less than 0.1 ppm to the one- and eight-hour CO concentrations. CO concentrations associated with intersection and parking activity would be less than the federal one- and eight-hour CO standards of 35 and 9 ppm. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to localized CO concentrations.

Mobile Source Air Toxics. Controlling air toxic emissions became a national priority with the passage of the CAAA of 1990, whereby Congress mandated that the USEPA regulate 188 air toxics, also known as hazardous air pollutants. Among the USEPA expansive list of compounds that are on the national and regional-scale cancer risk are acrolein, benzene, 1,3-butadiene, diesel particulate matter plus diesel exhaust organic gases, formaldehyde, naphthalene, and polycyclic organic matter. The SCAQMD recommends that health risk assessments be conducted for substantial sources of diesel particulate emissions (e.g., truck stops) and has provided guidance for analyzing mobile source diesel emissions.²⁴ The proposed streetcars would be electrically-powered and would not generate diesel particulate

²⁴ SCAQMD, Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Emissions, December 2002.

matter. Accordingly, MSAT emissions are not expected to increase with streetcar operations; thereby, Streetcar Alternatives 1 and 2 are considered to have low potential MSAT effects. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to MSAT.

In addition to streetcar activities, the proposed O & M Facility Site A or B may potentially create air toxic emissions impacts on human health. The O & M Facility Site would service streetcar vehicles and would require the use of solvents and related chemicals for cleaning and repair activities. The CARB has published guidance for locating pollutant generators near sensitive populations.²⁵ The recommendations include guidance on locating sensitive populations near sources of diesel emissions, chrome plating, dry cleaners, and gasoline-dispensing facilities. Neither O & M Facility Site A nor B would generate diesel emissions or be a substantial source of chemicals identified in the CARB guidance. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to air toxics.

Odors. O & M Facility Site A or B would require the use of solvents and related chemicals for cleaning and repair activities. These sources would not be used in sufficient quantities that would emit substantial odors for public complaints. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to odors.

Greenhouse Gas Emissions. The transportation and electricity sectors are the two largest GHG emitters in California. GHG emissions generated during operation of Streetcar Alternatives 1 and 2 would be associated with electricity consumption by the proposed streetcars and changes in VMT for each streetcar alternatives compared to the No Build Alternative. Streetcar Alternatives 1 and 2 would provide a new mass transit system and remove single-occupancy vehicles from the roadway system. Increasing commuter use of the transit system would reduce VMT and commuter-related emissions.

Table 3.12-6 presents the total GHG emissions, which include both operational emissions and construction emissions, amortized over 30-year time frame to obtain annual emissions. GHG significance thresholds have not been formally adopted on the regional or local level.

²⁵ CARB, *Air Quality and Land Use Handbook: A Community Health Perspective*, April 2005.

TABLE 3.12-6: GREENHOUSE GAS EMISSIONS – STREETCAR ALTERNATIVES

Scenario and Source	GHG (Metric Tons Per Year)
STREETCAR ALTERNATIVE 1 VS. NO BUILD	
Mobile	11
Electricity	1,212
Construction	1
Total	1,224
SCAQMD THRESHOLDS	10,000
Exceeds the Significance Threshold?	No
STREETCAR ALTERNATIVE 2 VS. NO BUILD	
Mobile	(69)
Electricity	1,212
Construction	1
Total	1,144
SCAQMD THRESHOLD	10,000
Exceeds the Significance Threshold?	No

Source: Terry A. Hayes Associates Inc., 2012.

GHG emissions associated with Streetcar Alternatives 1 and 2 would be approximately 1,224 and 1,144 metric tons of CO₂e per year, respectively, and would not exceed the SCAQMD's GHG significance threshold of 10,000 metric tons of CO₂e per year. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to GHG emissions.

Greenhouse Gas Reduction Plans. The consistency of Streetcar Alternatives 1 and 2 with GHG reduction plans, policies, and regulations was assessed by examining the Climate Change Scoping Plan, California Air Pollution Control Officers Association (CAPCOA) guidance, and the California Attorney General's guidance.

The Climate Changing Scoping Plan was developed by the CARB with input from the State Climate Action Team and proposes a comprehensive set of actions designed to reduce overall GHG emissions in California, improve environment, reduce oil dependency, diversify energy sources, and enhance public health while creating new jobs and improve the State economy.

The Climate Changing Scoping Plan states that local governments will play a significant role in the regional planning process to reach passenger vehicle GHG emissions reduction target established by CARB. A partnership of local and regional agencies is needed to create a sustainable vision for the future to accommodate population growth in a carbon efficient way while meeting housing needs and other planning goals. Coordination for enhanced public transit service combined with incentives for land use development that provides for a better market for public transit will play an important role in helping to reach regional targets. Streetcar Alternatives 1 and 2 would develop a mass transit infrastructure to provide an easily accessible mode of transportation for public transit patrons to connect to SARTC and therefore regional commuter and passenger rail systems, or to circulate within the Study Area. The fixed guideway would encourage a shift in mode of transportation travel from

private passenger vehicle to commuter use of the mass transit system. By reducing automobile dependency, regional VMT would be reduced, resulting in the reduction of commuter-related emissions. Streetcar Alternatives 1 and 2 would be consistent with the purpose of the Climate Change Scoping Plan.

In June 2009, CAPCOA released a guidance document presenting policies to reduce GHG emissions.²⁶ The following policies are relevant to Streetcar Alternatives 1 and 2:

- *TR-1.1: Transportation Planning.* The City/County will ensure that new developments incorporate both local and regional transit measures into the project design that promote the use of alternative modes of transportation.
- *TR-1.2: System Interconnectivity.* The City/County will create an interconnected transportation system that allows a shift in travel from private passenger vehicles to alternative modes, including public transit, ride sharing, car-sharing, bicycling and walking.
- *TR-1.3: Transit System Infrastructure.* The City/County will upgrade and maintain transit system infrastructure to enhance public use.
- *TR-1.4: Customer Service.* The City/County will enhance customer service and system ease-of-use.
- *TR-4.1: Development Standards for Bicycles.* The City/County will establish standards for new development and redevelopment projects to support bicycle use.
- *TR-6.1: Low to Zero Emission Vehicles.* The City/County will support and promote the use of low- and zero-emission vehicles.

Policy TR-1.1 is relevant to Streetcar Alternatives 1 and 2 on local transit measures because it is consistent with the City of Santa Ana Transit and City of Garden Grove General Plan, which seek to provide transportation and reduce air pollution through development and improvement of mass transit facilities. From a regional transit perspective, Streetcar Alternatives 1 and 2 are consistent with the AQMP, which seeks to reduce air pollutant emissions from reduction in vehicle trips and traffic congestion. Policy TR-1.2 is relevant to Streetcar Alternatives 1 and 2 because the purpose of a fixed guideway system is to encourage private passenger vehicle travelers to switch to an alternative mode of transportation (i.e., streetcars). Policy TR-1.3 is relevant to Streetcar Alternatives 1 and 2 because an O & M Facility is proposed to accommodate daily and routine streetcar inspections, interior/exterior cleaning of the streetcars, preventative (scheduled) maintenance, unscheduled maintenance, and component change-outs. Policy TR-1.4 is relevant to Streetcar Alternatives 1 and 2 because the streetcars would be reliable and easily accessible to communities within and near the Study Area. Policy TR-4.1 is relevant only to Streetcar Alternative 2 because new bicycle lanes are proposed to be incorporated into the existing network within Civic Center Drive. Policy TR-6.1 is relevant to Streetcar Alternatives 1 and 2 because the proposed streetcar vehicles would be electrically-powered, resulting in negligible air pollutant emissions generation. Streetcar Alternatives 1 and 2 would be consistent with

²⁶ CAPCOA, *Model Policies for GHGs in General Plans*, <http://www.capcoa.org/wp-content/uploads/downloads/2010/05/CAPCOA-ModelPolicies-6-12-09-915am.pdf>, accessed on July 29, 2012.

the policies established by CAPCOA. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to operational GHG plans, policies, and regulations.

In early 2010, a joint committee with equal representation from the Orange County Council of Governments (COG) and OCTA was formed to develop the Orange County Sustainable Communities Strategy (SCS). The Orange County COG/OCTA SCS Joint Working Committee led overall efforts to develop a subregional Orange County SCS to meet the requirements of SB 375 and the mutual agreements with SCAG with a plan that all local jurisdictions in Orange County could support. As a result of this collaborative effort, the Orange County SCS was adopted unanimously by the OCTA and Orange County COG Boards of Directors in June of 2011. The Orange County SCS utilizes the transportation system improvements along with land use and Best Management Practices strategies to help the County to achieve the State-mandated emissions reduction targets. The strategies include:

- Improve attractiveness of transit modes through enhanced service, frequency, convenience, and choices. Improve linkages between transit options to diminish automobile travel
- Expand and enhance TDM practices to reduce barriers to alternate travel modes and attract commuters away from single occupant vehicle travel

Under Streetcar Alternatives 1 and 2, the implementation of the streetcars would attract commuters away from single-occupancy vehicle travel and positively affect vehicular congestion. The Streetcar Alternatives 1 and 2 are consistent with the Orange County SCS strategies of reducing GHG emissions from automobile travel. The California Attorney General has prepared a fact sheet listing various mitigation measures that local agencies may consider to offset or reduce climate change impacts and ensure compliance with AB 32. The following mitigation measures are relevant to Streetcar Alternatives 1 and 2:

- Create local "light vehicle" networks, such as neighborhood electric vehicle systems;
- Promote "least polluting" ways to connect people and goods to their destinations;
- Provide information on alternative transportation options for customers, residents, tenants and employees to reduce transportation-related emissions; and
- Incorporate bicycle lanes, routes and facilities into street systems, new subdivisions, and large developments.

Streetcar Alternatives 1 and 2 are designed to reduce VMT-related emissions by encouraging the use of public transit by providing accessibility to activity centers that provide employment and educational opportunities, goods and services. Under Streetcar Alternative 2, a bicycle facility is proposed, furthering a reduction in transportation-related emissions. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to GHG plans, policies, and regulations.

IOS-1 and IOS-2

Air quality impacts from the implementation of IOS-1 and IOS-2 would be similar to those identified for Streetcar Alternatives 1 and 2. **Table 3.12-7** shows that VMT-related operational emissions associated with IOS-1 and IOS-2 would be a less than one pound per

day difference from emissions under the No Build Alternative. The net difference in emissions would be negligible and would not exceed the SCAQMD significance thresholds. Although the IOS Alternatives would not connect to the City of Garden Grove, they would still include the development of mass transit infrastructure that is a Transportation Control Measure in the AQMP to reduce air pollutant emissions via a reduction in vehicle trips and congestion. Therefore, IOS-1 and IOS-2 would result in less-than-significant impacts related to regional operational emissions.

TABLE 3.12-7: OPERATIONAL EMISSIONS – IOS-1 AND IOS-2							
Project Alternative	VMT	Pounds Per Day					
		CO	NOX	TOG	SO ₂	PM ₁₀	PM _{2.5}
No Build	128,393	181	15	5	< 1	1	1
IOS-1	128,467	181	15	5	< 1	1	1
IOS-2	127,913	181	15	5	< 1	1	1

Source: URS, Air Quality Impact Analysis Technical Report, 2011.

Greenhouse Gas Emissions. GHG emissions generated during operation of IOS-1 and IOS-2 would be similar to Streetcar Alternatives 1 and 2. **Table 3.12-8** presents the total GHG emissions, which include both operational emissions and construction emissions, amortized over a 30-year time frame to obtain annual emissions. GHG emissions associated with IOS-1 and IOS-2 would be approximately 1,224 and 1,144 metric tons of CO₂e per year, respectively, and would not exceed the SCAQMD’s GHG significance threshold of 10,000 metric tons of CO₂e per year. Therefore, IOS-1 and IOS-2 would result in less-than-significant impacts related to GHG emissions.

3.12.4.2 Significance After Mitigation

Impacts related to air quality and GHG emissions would be less than significant. No mitigation measures are required.

TABLE 3.12-8: GREENHOUSE GAS EMISSIONS – IOS-1 AND IOS-2	
Scenario and Source	GHG (Metric Tons Per Year)
IOS-1 VS. NO BUILD	
Mobile	11
Electricity	1,212
Construction	0.67
Total	1,224
SCAQMD THRESHOLDS	10,000
Exceeds the Significance Threshold?	No
IOS-2 VS. NO BUILD	
Mobile	(69)
Electricity	1,212
Construction	0.67
Total	1,144
SCAQMD THRESHOLD	10,000
Exceeds the Significance Threshold?	No

Source: Terry A. Hayes Associates Inc., 2012.

3.13 Energy Resources

This section provides an overview of energy resources and was prepared utilizing the Energy Output Tables included as Appendix L. The analysis is based on the affected environment and project features, and evaluates operational impacts associated with the proposed project.

3.13.1 Affected Environment

Energy resources for transportation include petroleum, natural gas, electricity, liquefied petroleum gas, hydrogen and biofuels, such as ethanol. Currently, California's gasoline and diesel markets are characterized by increasing demands, tight supplies and unstable prices. California imports more than 50 percent of its crude oil and over 15 percent of its refined products. The State's dependence on this increasingly expensive energy resource continues to grow. Fossil fuel-based transportation of products and people is a major contributor of carbon dioxide, which is a principal catalyst related to climate change. Changes in energy supply and demand are affected by factors such as energy prices, the condition of the United States' economy, advances in technologies, changes in weather patterns and future public policy decisions.

Transportation sector energy consumption in the United States is anticipated to grow at an average annual rate of 0.6 percent from 2009 to 2035. Energy consumption in California continues to be dominated by growth in passenger vehicles; approximately 40 percent of all energy consumed in the State is used for transportation. California's population is estimated to exceed 44 million by 2020, which would result in substantial increases in transportation fuel demand for the State.

Similar to the State, most of the energy consumption in the Cities of Santa Ana and Garden Grove comes from the transportation sector. Transportation energy consumption is based on the types and numbers of vehicles, the extent of their use (VMT), and their fuel economy (miles per gallon). The primary transportation fuels expected to be consumed within the Study Area would be gasoline for light-duty automobiles, diesel and gasoline for commercial trucks, and natural gas for buses. According to the California Energy Commission, Statewide VMT for all on-road vehicles is predicted to increase annually by an average of 1.7 percent through 2030.

3.13.2 Environmental Consequences

3.13.2.1 No Build Alternative

The No Build Alternative includes existing conditions within the Study Area and adds future planned and funded transit and roadway improvement projects. Each of these future projects will be environmentally cleared through separate project-specific environmental documentation. Under the No Build Alternative, the demand on regional energy supplies, energy saving, and traffic congestion conditions would be unchanged. Due to insufficient capacity, low travel speeds and longer delays are anticipated to arise within the Study Area. This condition would directly contribute to inefficient energy consumption because automobiles would consume extra fuel when in idle mode or when traveling at a slower speed

through congested roadways. Therefore, the No Build Alternative would result in adverse effects related to energy resources.

3.13.2.2 TSM Alternative

The TSM Alternative emphasizes low-cost improvements and operational efficiencies, such as focused traffic engineering actions, expanded bus service, and improved access to transit services. It may include some minor physical enhancements, such as improvements to transit stop amenities (e.g., bus benches). This alternative would minimally change the demand on regional energy supplies and would not require substantial additional capacity. It would result in lower energy resources demand via energy savings in transportation fuels from reduced vehicle trips and associated traffic congestion than the No Build Alternative. Therefore, the TSM Alternative would not result in adverse effects related to energy resources.

3.13.2.3 Streetcar Alternatives 1 and 2

Energy consumption associated with Streetcar Alternatives 1 and 2 have been assessed for electricity use and transportation fuel consumption. Since the proposed streetcars would be electrically powered, electricity consumption under Streetcar Alternatives 1 and 2 are evaluated. Generally, streetcar systems require low power for operation and can be supported by utility secondary voltage ranging between 120 to 480 volts. Both Streetcar Alternatives 1 and 2 include six TPSS. The TPSS would be placed at approximately half-mile intervals along the proposed alignment. The TPSS would maintain operational voltage levels while eliminating the need for adding underground conduits for a parallel feed cable. It is estimated that Streetcar Alternatives 1 and 2 would individually required 4,140,409 kilowatt-hours (kWh) per year. Orange County consumed 20,698 million kWh in the year 2010 for both residential and nonresidential uses. Streetcar Alternatives 1 and 2 would have similar operating characteristics (e.g., operating hours, travel speeds, and frequency of services) and energy requirements. Energy consumption from Streetcar Alternatives 1 and 2 represents approximately 0.02 percent of the annual electricity consumption. This minimal change would result in a negligible difference in electricity consumption within the Study Area. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to electricity resources.

The VMT associated with Streetcar Alternatives 1 and 2 was assessed to determine if operation of either of these alternatives would cause a substantial change in VMT and fuel consumption. Transportation energy consumption reflects the types and numbers of vehicles, the extent of their use (VMT), and their fuel economy (miles per gallon). As shown in **Table 3.13-1**, the VMT estimated for Streetcar Alternatives 1 and 2 are within one percent of the No Build Alternative. This minimal change would result in a negligible difference in energy consumption of transportation fuels for vehicles within the Study Area. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to transportation fuel resources.

TABLE 3.13-1: VEHICLES MILES TRAVELED (2035)

Project Alternative	VMT	Difference from No Build Alternative	Percent Increase from No Build Alternative (%)
No Build	128,393	0	0
TSM	129,007	614	0.5
Streetcar 1	128,467	74	0.1
Streetcar 2	127,913	(480)	(0.4)
IOS-1	128,467	74	0.1
IOS-2	127,913	(480)	(0.4)

Note: VMT increases from the No Build Alternative to the TSM, Streetcar 1, and IOS-1 Alternatives result from inconsistencies associated with applying a regional model (OCTAM) to evaluate a small study area rather than county-wide conditions.

URS, 2012. *Traffic, Circulation, and Parking Technical Report*, October 2012.

O & M Facility Sites A and B share similar energy characteristics and both are represented by the following analysis. The selected O & M Facility would be a stand-alone building used to store and maintain the streetcar vehicles. The O & M Facility would accommodate both maintenance and administrative functions. It is anticipated that the O & M Facility would be illuminated with low-level lighting used for 24-hour operation. Existing uses located on potential O & M Facility Sites A and B (e.g., Madison Materials and SA recycling, respectively) include energy-intensive activities, consisting of heavy-duty equipment and truck operations. Due to their energy-intensive practices, these activities would consume more energy than would be consumed by the O & M Facility. In addition, the O & M Facility would result in transportation fuel consumption from approximately 25 employees. It is anticipated that the low-level lighting and transportation fuel use associated with 25 employees would result in a negligible difference in energy consumption within the Study Area. Therefore, the Streetcar Alternatives 1 and 2 would not result in adverse effects related to transportation fuel resources.

3.13.2.4 IOS-1 and IOS-2

Similar to Streetcar Alternatives 1 and 2, streetcar operations under IOS-1 and IOS-2 would be electrically powered. However, electricity consumption under IOS-1 and IOS-2 is expected to be less when compared to Streetcar Alternatives 1 and 2 because of the shorter alignment. Additionally, the number of transit vehicles would be reduced from seven to six vehicles and TPPs would be reduced from six to four. Under IOS-1 and IOS-2, electricity consumption is estimated to be 1,194,953 kWh per year. Energy consumption from IOS-1 and IOS-2 individually represent approximately 0.006 percent of the annual electricity consumption. This minimal change would result in a negligible difference in electricity consumption within the Study Area. Therefore, IOS-1 and IOS-2 would not result in adverse effects related to electricity resources.

The effects of IOS-1 and IOS-2 as related to transportation fuel savings would be similar to those of the Streetcar Alternatives 1 and 2. Similar to Streetcar Alternatives 1 and 2, transportation fuel consumption is anticipated to be reduced as personal automobile travelers switch to more efficient use of transportation (e.g., streetcar system and bicycling). The

VMT estimated for each IOS-1 and IOS-2 is within one percent of the No Build Alternative. This minimal change would result in a negligible difference in energy consumption of transportation fuels for vehicles within the Study Area. Therefore, the IOS-1 and IOS-2 would not result in adverse effects related to transportation fuel resources.

Under IOS-1 and IOS-2, activities at the O & M Facility would remain unchanged from Streetcar Alternatives 1 and 2. Therefore, IOS-1 and IOS-2 would not result in adverse effects related to electricity and transportation fuel resources.

3.13.3 Measures to Minimize Harm

Operational effects related to energy resources would not be adverse. No mitigation measures are required.

3.14 Water Quality, Hydrology, and Floodplains

This section provides an overview of water quality, hydrology, and floodplains and was prepared utilizing the Water Resources Technical Report included as Appendix M. The analysis is based on the affected environment and project features, and evaluates operational impacts associated with the proposed project.

3.14.1 Affected Environment

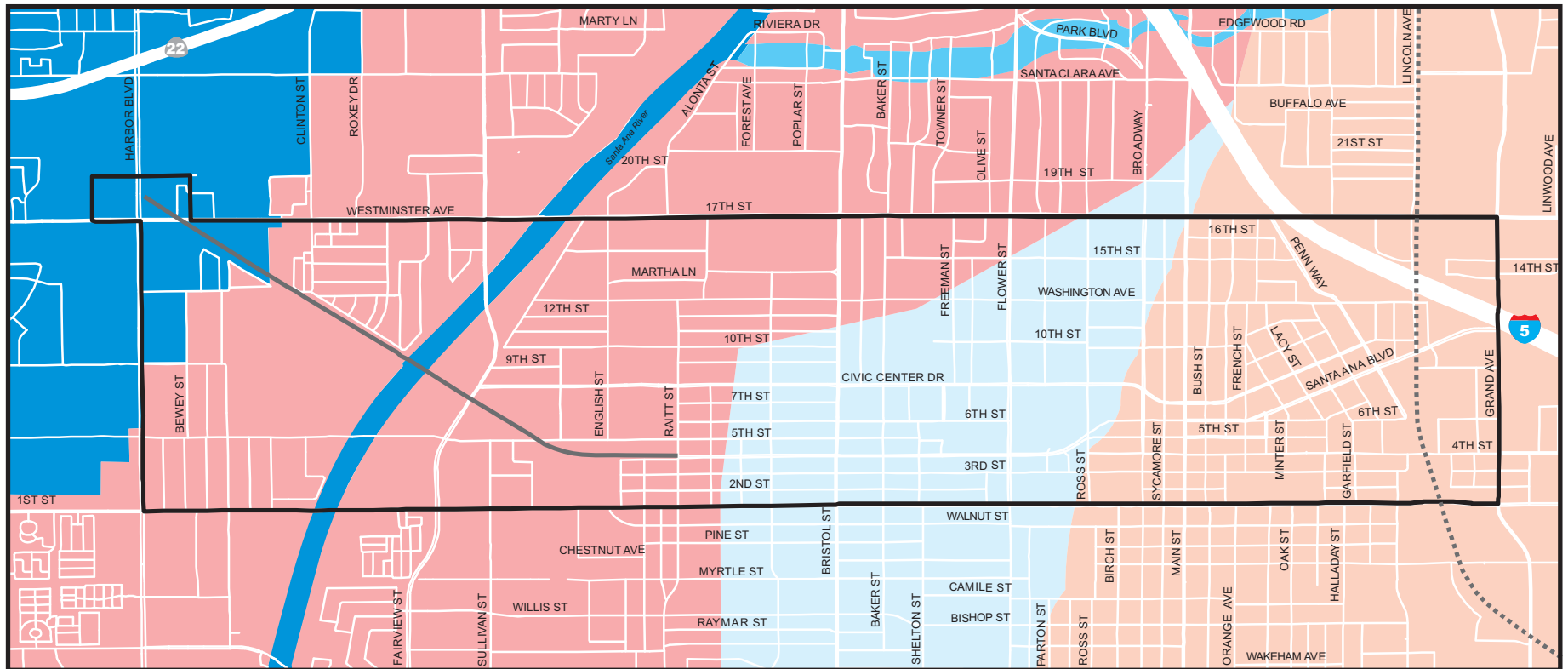
3.14.1.1 Floodplains

The Federal Emergency Management Agency (FEMA) completed a floodplain analysis that resulted in the development of Flood Insurance Rate Maps (FIRMs). FIRMs identify and estimate the limits of 100- and 500-year flood events in each watershed. As shown in **Figure 3.14-1**, flood zones within the Study Area include areas inundated by 100-year flooding, areas with a 0.2 percent annual chance of 500-year flooding, and areas protected by levees.

Projects within a floodplain require a detailed analysis in the environmental document as specified in the U.S. Department of Transportation Order 5650.2 Floodplain Management and Protection. The analysis is to discuss risk to or resulting from the action; the impacts on natural and beneficial floodplain values; the degree to which the action provides direct or indirect support for development in the floodplain; and measures to minimize harm or to restore or preserve the natural and beneficial floodplain values affected by the cumulative project.



Flood Hazard Zones



LEGEND:

Study Area	Zone A - An area inundated by 100-year flooding
PE ROW	Zone AE - Areas subject to inundation by the 1% annual chance flood event determined by base flood elevations
Metrolink/Amtrak Rail Line	0.2% Annual chance flood hazard (500-year)
0 1500 3000 FEET	Zone X - Protected by levee
NORTH	Zone X - An area determined to be outside the 100- and 500-year floodplains

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3.14.1.2 Water Quality

Surface Water Quality

The Study Area is located within the Santa Ana River Basin (SARB). The SARB is a group of connected inland basins and open coastal basins drained by surface streams flowing generally southwestward to the Pacific Ocean. The Santa Ana River is the only designated water of the U.S. located in the Study Area.

Where surface water quality standards are not being achieved, Section 303(d) of the Clean Water Act (CWA) requires identifying and listing that water body as “impaired.” This listing of impaired water bodies is typically referred to as the “303(d) List”. A water body can be listed for one or more impairments. Once a water body has been included on a 303(d) List, a Total Maximum Daily Load (TMDL) for the pollutant causing the impairment must be developed for that water body.

A TMDL is the allowable total pollutant load that can be discharged from all sources, and still ensure that water quality standards are achieved (e.g., water quality objectives are met and beneficial uses are protected). The TMDL must also include a margin of safety. TMDLs are established by RWQCBs under the Porter-Cologne Act through amendment of the Basin Plans. A Basin Plan is a document designed to preserve and enhance water quality and protect beneficial uses of all regional waters. The Basin Plan designates beneficial uses for surface and groundwater, sets narrative and numerical water quality objectives, and describes the implementation of programs to protect water regionally. Once established, the TMDL is allocated among current and future dischargers into the water body.

There are no impaired water bodies in the Study Area. Regionally, the Newport Bay (Lower), East Garden Grove Wintersburg Channel and Huntington Harbour have been determined to be impaired by the SWRCB and are included on the 303(d) list of impaired water bodies since they do not meet established water quality standards. The water quality objectives these three water bodies must meet are in varying stages of development. The listings for Wintersburg Channel and Huntington Harbour are proposed objectives not currently developed into impairments or enforced. While not all objectives are included in the objective regulations, these water bodies (Newport Bay only at this time) are considered impaired from pathogens (fecal coliform), sediment toxicity, chlordane, PCBs, Ammonia, as well as metals (copper, lead, and nickel). These contaminants have impacted Newport Bay in the form of excessive sedimentation, eutrophication, bacterial contamination, and toxic contamination. The County of Orange regularly monitors surface water quality in Newport Bay including many of the constituents for which these water bodies are impaired.

Groundwater Quality

The Coastal Plain of Orange County Groundwater Basin underlies a coastal alluvial plain in the northwestern portion of Orange County. This Basin underlies the lower Santa Ana River Watershed. The Main Groundwater Sub-basin that underlies the Santa Ana Watershed area is located in an area that is characterized by a deep structural alluvial basin containing a thick

accumulation of interbedded sand, silt and clay. The Orange County Basin contains three defined aquifer units: the Upper, Principal (or Middle) and Lower aquifers. The Basin is bisected by the Santa Ana River, which serves as a source of water used for groundwater recharge. However, the main recharge areas for the Orange County Basin are located in spreading grounds outside of the Study Area. In general, groundwater in the main producing aquifers is good quality with low average concentrations of total dissolved solids. The water basin has a few localized areas of shallow contamination; however, very little water is pumped from these shallow aquifers.

3.14.2 Environmental Consequences

3.14.2.1 No Build Alternative

The No Build Alternative includes existing conditions within the Study Area and adds future planned and funded transit and roadway improvement projects. Each of these future projects will be environmentally cleared through separate project-specific environmental documentation. The streetcar would not operate under this alternative and there would not be related water quality, hydrology, and floodplains impacts. Therefore, the No Build Alternative would not result in adverse effects related to water quality, hydrology, and floodplains.

3.14.2.2 TSM Alternative

The TSM Alternative emphasizes low-cost improvements and operational efficiencies, such as focused traffic engineering actions, expanded bus service, and improved access to transit services. It may include some minor physical enhancements, such as improvements to transit stop amenities (e.g., bus benches). These minor improvements would have no or negligible impacts to water quality, hydrology, and floodplains. Therefore, the TSM Alternative would not result in adverse effects related to water quality, hydrology, and floodplains.

3.14.2.3 Streetcar Alternatives 1 and 2

Streetcar Alternatives 1 and 2 have slight differences in alignments but are located in the same general vicinity and share the same hydrology and water quality characteristics. Streetcar Alternatives 1 and 2 mainly cross over flood zones that have the least risk of flooding. A small portion of the Study Area is within an area of low to moderate hazard and is not expected to be inundated during the 100-year flood. There are also locations that would be inundated during a 100-year flood at channel crossings and within the western portion of the proposed alignment. Development in this area is required to follow applicable federal and State regulations guiding flood management.

The Study Area crosses the Santa Ana River, approximately 20 miles downstream of the Prado Dam, and 15 miles downstream of Santiago Creek and Irvine Lake Dam. The greatest potential for flooding would be by dam inundation of the Prado Dam or a 500-year flood. These events are unlikely with a 0.2 percent chance of occurring annually. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to floodplains.

With the exception of one location along the PE ROW where the proposed alignment crosses the Santa Ana River, the existing drainage pattern would not be substantially altered or impacted by Streetcar Alternatives 1 and 2. Streetcar tracks would be constructed mostly at-grade with the existing street ROW and the PE ROW. The streetcar tracks do not have gutters like a traditional road, but water that falls onto impervious surfaces associated with the track system would be collected and conveyed into the storm drain system by inlets similar to roadway inlets. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to surface water.

The three stormwater National Pollutant Discharge Elimination System (NPDES) permits that are applicable to the proposed project are the:

1. General Permit for Storm Water Discharges Associated with Construction Activities, NPDES No. CAS000002, as amended (Construction General Permit);
2. Santa Ana Regional Water Quality Control Board (RWQCB) Municipal Separate Storm Sewer System (MS4) NPDES Permit for the County of Orange, Orange County Flood Control District, and incorporated cities, NPDES Permit No. CAS618030 (MS4 Permit). The MS4 Permit governs stormwater and urban runoff discharged into the MS4, operated by the County and cities, and provides conditional approval of certain non-stormwaters to be discharged through the MS4 as long as such discharges are not identified as a significant source of pollutants; and
3. General Permit for Storm Water Discharges Associated with Industrial Activities NPDES No. CAS000001 (for the O & M facilities).

The Drainage Technical Report included as Appendix P has a discussion of Santa Ana River hydraulics. The existing bridge would remain in its current location and condition. A new single-track bridge would be constructed immediately south of the existing bridge for the fixed guideway. The result is that the area of the footprint is slightly larger (72 square feet larger) than with the existing bridge alone. This will result in a negligible impact to channel capacity. Because the pier face of the new bridge will be approximately four-feet wide and tucked immediately south behind the existing nine-foot pier face, the impact to channel hydraulics is also projected to be minimal. The channel was designed for a 100-year flood event and would function at the current design capacity after construction of the new bridge.

It is expected that the construction of this bridge would have a minimal impact on the river hydraulics, other structures in the floodplain, and the structural integrity of the Santa Ana River channel. This would be further studied in a detailed hydrological analysis after the LPA has been selected and design moves past the preliminary stages. The effects on the existing 100-year floodplain shown on the FIRM (Panel 06059C0143J) are expected to be minimal, and increases in the 100-year water surface elevation will be within the allowable limits set forth in CFR 44, Parts 60 and 65 of the National Flood Insurance Program. Streetcar Alternatives 1 and 2 would comply with Executive Order 11988, which requires federal agencies to avoid long- and short-term adverse impacts associated with the occupancy and modification of flood plains and to avoid direct and indirect support of floodplain development

wherever there is a practicable alternative. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to channel hydraulics in the Santa Ana River.

Streetcar Alternatives 1 and 2 entail the construction of an overcrossing at the Santa Ana River. The Santa Ana River is a constructed flood-control facility composed of concrete bed and banks and is unvegetated, with no associated riparian vegetation beyond the banks. Streetcar Alternatives would permanently impact approximately 0.003 acres (140 square feet) of non-wetland Waters of the US, all of which would occur within the concrete-lined channel. Adverse impacts are expected to be negligible and the operation of the bridge would not impact an aquatic habitat.

Streetcar Alternatives 1 and 2 would likely generate surface water pollutants in stormwater runoff and along the track alignment in daily maintenance activities. Stormwater runoff associated with the streetcar activities would drain into Newport Bay, which is listed as a 303(d) resource. Pollutants in stormwater runoff from street portions of the alignment would be limited to very small amounts of oil from lubricated equipment. Stormwater from non-street portions of the alignment may be directed to vegetated swales for treatment before conveyance to the City storm drain. This (BMP and others designed to reduce potential surface water pollution would eliminate potential impacts. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to surface water.

Section 404 of the CWA, administered by the U.S. Army Corps of Engineers regulates the discharge of dredged and/or fill material into waters of the United States including wetlands. The term "waters of the U.S." generally defines Army Corps jurisdiction, and is fully defined in 33 CFR Part 328. Projects that require the discharge of dredged or fill material into Army Corps jurisdictional waters require the issuance of a CWA Section 404 permit, that demonstrates proper avoidance, minimization and compensation of impacts to Army Corps jurisdictional resources. A Section 404 permit would be required since the alignment crosses the Santa Ana River. Although the specific Section 404 permit will not be determined until the permitting process begins with the U.S. Army Corps of Engineers, it is anticipated that the project will require a Nationwide Permit 14 associated with Linear Transportation Projects. For linear transportation projects in non-tidal waters, the discharge cannot cause the loss of greater than 0.5 acres of waters of the United States.

In accordance with Section 401 of the CWA, an applicant for a Section 404 permit must obtain certification from the RWQCB stating the proposed project does not violate water quality standards and criteria specified in the Basin Plan. A request for certification of Waste Discharge Requirements is submitted to the RWQCB at the same time that an application for a Section 404 permit is filed with the U.S. Army Corps of Engineers.

In addition to Section 401 and 404 permits, implementation of Streetcar Alternatives 1 and 2 would likely require a California Department of Fish and Wildlife Lake and Streambed Alteration Agreement for impacts to the Santa Ana River and an Encroachment Permit from the Orange County Flood Control District related to construction within the Santa Ana River Channel.

Streetcar Alternatives 1 and 2 are transportation facilities and would not deplete groundwater supplies or discharge water into the groundwater table. Because the majority of the project area is presently developed and the Study Area does not serve as a spreading basin for groundwater recharge, Streetcar Alternatives 1 and 2 would not substantially reduce recharge. Drainage improvements near the Santa Ana River would comply with all applicable State and federal regulations to ensure that no untreated runoff would enter into the water supply. Potential O & M Facility Sites A and B would use water for maintenance activities (e.g., vehicle washing) and worker hygiene. Implementation of BMPs would ensure that water use would be minimal and would not deplete groundwater supplies. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to groundwater.

3.14.2.4 IOS-1 and IOS-2

IOS-1 and IOS-2 will terminate at the Raitt Street and Santa Ana Boulevard Station rather than extending further west to Harbor Boulevard and Westminster Street. IOS-1 and IOS-2 alignments do not cross the bridge. Therefore, there is no effect on water quality, hydrology, and flood plains. There is also no change to the O & M Facility activities under IOS-1 and IOS-2. Therefore, IOS-1 and IOS-2 would not result in adverse effects related to water quality, hydrology, and floodplains.

3.14.3 Measures to Minimize Harm

The proposed project would be subject to the new development/significant redevelopment requirements of the County Drainage Area Management Plan (DAMP)/City of Santa Ana Local Implementation Plan (LIP). The DAMP/LIP requires implementation of Water Quality Management Plan post-construction BMPs to address pollutants of concern and hydrologic conditions of concern for a project's stormwater runoff. Refer to the Water Resources Technical Report included as Appendix M for a full discussion of the Water Quality Management Plan and related BMPs.

Streetcar Alternatives 1 and 2 and the IOS Alternatives would be required to comply with BMPs to control potential water quality impacts. With implementation of the BMPs, the build alternatives would not result in adverse effects related to water quality.

- The City of Santa Ana will comply with Regional Water Quality Control Board for a Section 401 permit and U.S. Army Corps of Engineers requirements for a Section 404 permit to demonstrate proper avoidance, minimization and compensation of impacts to the Santa Ana River.
- In conformance with CFR 44, Parts 60 and 65 of the National Flood Insurance Program, a hydraulic model shall be prepared during the final design of Streetcar Alternative 1 or 2 to include the pier dimensions for the new Santa Ana River Bridge. The hydraulic model will confirm that there would be no adverse effect on the 100-year water surface elevation. The new Santa Ana River Bridge deck will be designed to be above the revised 100-year water surface elevation and design measures to reduce scouring and sediment deposition around new piers will be refined during the final design phase.

- The following activity restrictions shall be communicated to O & M Facility staff upon hire and annually thereafter to prevent potential impacts to receiving waters:
 - Trash receptacles shall remain closed at all times except when being emptied by maintenance staff;
 - Trash receptacles shall be emptied weekly by City of Santa Ana maintenance personnel or more frequently if necessary;
 - Trash receptacles at station locations shall be covered or sheltered by a roof or overhang whenever possible; and
 - Vehicle washing, maintenance, and repair shall be limited to specified areas in the O & M Facility.

- The following BMPs shall be implemented to manage landscaping in common areas and at the O & M Facility:
 - Irrigation systems shall be inspected, adjusted, repaired and maintained for proper functioning and water use;
 - Vegetated areas shall be inspected for erosion and repaired promptly;
 - Dead vegetation shall be removed and replaced;
 - Organic fertilizers, such as compost, peat, and mulch shall be applied wherever possible to increase soil porosity and water retention;
 - Only the minimum amount of fertilizer needed shall be applied and incorporated directly into the soil around plants, where possible, to minimize potential surface runoff;
 - Pesticides shall be used only according to manufacturer recommendations;
 - Proper licensing for supervision and training shall be required of staff to use and apply pesticides; and
 - Integrated Pest Management practices shall be used to control insects.

- The O & M Facility Manager shall train employees to:
 - Report spills, leaks, or litter that have the potential to enter the receiving waters;
 - Inform the O & M Facility Manager when violations of water quality occur;
 - Inspect structural BMPs on a fixed schedule (e.g., monthly), as well as during and after storm events;
 - Schedule a maintenance contractor to clean the on-site treatment control BMPs;
 - Ensure the on-site catch basin is maintained and inspected in accordance with the maintenance schedule; and
 - Appropriately manage water quality based on materials available through the following websites:
http://www.ocwatersheds.com/StormWater/documents_bmp_existingdevelopment.asp
http://www.ocwatersheds.com/PublicEducation/pe_introduction.asp

- Good housekeeping practices shall be implemented in the O & M Facility. These practices include ensuring that:
 - Waste materials are collected and properly disposed after the completion of each job, shift, or day as appropriate;

- The parts and equipment loading dock are kept in a clean and orderly condition through a program of sweeping and litter control and immediate cleanup of spills and leaks;
 - Indoor work areas are neat, uncluttered, and well-ventilated to discourage outdoor work and to allow leaks and spills to be quickly detected and controlled; and
 - Paved outdoor work areas are mechanically swept every two or three months (not hosed) and kept neat and clean.
- Storm water flows deriving from portions of the alignment along Santa Ana Boulevard would flow to curb inlets which would flow to a proprietary treatment control BMP (e.g., Filterra, StormFilter) and then to the City storm drain. Storm water for the portions of the alignment that run through the non-paved areas would flow through a vegetated swale BMP, would be collected through an inlet, and would be conveyed to the storm drain. The City of Santa Ana would ensure that the on-site drain inlets, drainpipes, and treatment control BMPs are periodically inspected. This would consist of monthly inspections by trained city personnel. The curb inlets would be visually inspected from the surface. When sediment and debris levels are determined to be impeding conveyance, sediment and debris accumulated inside the chamber would be removed.
 - A stencil reading “NO DUMPING DRAINS TO OCEAN” shall be placed on all drain inlet curbs. The O & M Facility Manager shall inspect the stencils annually to make sure the lettering is legible. If the lettering is not legible, the signage shall be re-stenciled or replaced as needed.
 - The landscape plan shall be designed utilizing plants with low irrigation requirements and with minimal need of fertilizers and pesticides to sustain growth. The irrigation system shall be designed to apply the proper volume of water to avoid excess runoff. This may include the use of computer-controlled irrigation equipment that receives daily evapotranspiration data, including an override for periods of rainfall. The irrigation system design shall incorporate flow reducers or shutoff valves to control water loss in the event of broken irrigation heads or lines.
 - Exposed slopes shall be protected with vegetation.
 - Wastewater from within the O & M Facility bays or loading docks shall be directed to the sanitary sewer or to a dead end sump. A dead end sump allows for managed spill control and is typically some type of concrete basin or tank with a pump attached. The loading dock shall be swept daily and spills shall be cleaned immediately. The stormwater runoff from the maintenance yard shall be treated before entering into the City or regional drainage facilities.
 - The vehicle washing area in the O & M Facility shall be clearly marked as a designated washing area. It shall be covered by a permanent canopy and surrounded by concrete curb or other containment structure. The area shall be sloped such that wash water would be retained within the wash area and flow to a pretreatment system before being discharged to the sanitary sewer. The pretreatment system shall be in the form of an oil/water separator. The connection to the sanitary sewer shall be properly permitted with the

applicable agency (City of Santa Ana or Irvine Ranch Water District). Vehicle washing outside the area shall be strictly prohibited. Staff shall be trained in proper washing procedures upon commencement of employment and annually thereafter. The area shall be inspected daily for trash and debris, and swept on an as-needed basis. The pretreatment system shall be inspected quarterly and would be cleaned annually, at a minimum, by a licensed service contractor.

3.14.4 CEQA Determination

3.14.4.1 Significance Criteria and Significance Criteria Application

In accordance with Appendix G of the State CEQA Guidelines, the proposed project would have a significant impact related to hydrology and water quality if it would:

- Violate Regional Water Quality Control Board water quality standards or waste discharge requirements;
- 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 (i.e., 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);
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of stream or river, in a manner which would result in substantial erosion or siltation on or off-site;
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of 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;
- 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;
- Otherwise substantially degrade water quality;
- Place housing within a 100-year floodplain, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;
- Place within a 100-year floodplain structures which would impede or redirect flood flows;
- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of failure of a levee or dam; and/or
- Inundation by seiche, tsunami, or mudflow.

No Build Alternative

As discussed in Section 3.14.2.1 above, the streetcar would not operate under the No Build Alternative and there would not be related water quality, hydrology, and floodplains impacts. Therefore, the No Build Alternative would have no impacts related to hydrology, water quality, and floodplains.

TSM Alternative

As discussed in Section 3.14.2.2 above, improvements associated with the TSM Alternative would have negligible effects to hydrology and water quality. Therefore, the TSM Alternative would have no impacts related to hydrology, water quality, and floodplains.

Streetcar Alternatives 1 and 2

Water Quality, Waste Discharge, and Stormwater Runoff. As discussed in Section 3.14.2.3 above, Streetcar Alternatives 1 and 2 would likely generate pollutants that could travel in stormwater runoff along the track alignment in daily maintenance activities. BMPs designed to reduce potential stormwater pollution would eliminate potential impacts to water quality (Section 3.14.3 above). Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to water quality, water discharge, and stormwater runoff.

Groundwater. As discussed in Section 3.14.2.3 above, the proposed project is a transportation facility and would not deplete groundwater supplies. Potential O & M Facility Sites A and B would use water for maintenance activities (e.g., vehicle washing and landscaping and screening) and worker hygiene. Implementation of BMPs would ensure that water use would be minimal. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to groundwater.

Drainage Pattern. As discussed in Section 3.14.2.3 above, the existing drainage pattern of the alignments for both Streetcar Alternatives 1 and 2 would not be substantially altered or impacted by the proposed project. The streetcar tracks do not have gutters like a traditional road, but water that falls onto impervious surfaces associated with the track system would be collected and conveyed into the storm drain system by inlets similar to roadway inlets. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to the drainage pattern.

Floodplains. As discussed in Section 3.14.2.3 above, a small portion of the Study Area is within an area of low to moderate hazard and is not expected to be inundated during the 100-year flood. There are also locations that would be inundated during a 100-year flood at channel crossings and within the western portion of the proposed project alignment. Development in this area is required to follow applicable federal and State regulations guiding flood management. The effects on the existing 100-year floodplain shown on the FIRM (Panel 06059C0143J) are expected to be minimal, and increases in the 100-year water surface elevation will be within the allowable limits set forth in CFR 44, Parts 60 and 65 of the National Flood Insurance Program. In addition, the Study Area crosses the Santa Ana River. The greatest potential for flooding would be by dam inundation of the Prado Dam or a 500-year flood. These events are unlikely with a 0.2 percent chance of occurring annually. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to floodplains.

Seiche, Tsunami, or Mudflow. Seiches are waves that rock back and forth in enclosed bodies of water, such as lakes, reservoirs, bays, or harbors. There are no bodies of water in the

vicinity of the Study Area that are large enough to produce a seiche. Therefore, Streetcar Alternatives 1 and 2 would result in no impacts related to seiches.

A tsunami is a spontaneous water wave that occurs when a large section of submerged continental shelf or slope is rapidly displaced vertically during a large earthquake or submarine slide. The Study Area is located approximately nine miles inland of the Pacific Ocean and would not be subject to tsunami inundation. Therefore, Streetcar Alternatives 1 and 2 would result in no impacts related to tsunamis.

Mudflow hazards typically occur where unstable hill slopes are located above gradient. The closest hillsides up-gradient from the site are more than ten miles to the north, and are separated from the site by urban development, including residential uses, streets, and storm drain systems, which makes it unlikely that the site would experience effects caused by mudslides. Therefore, Streetcar Alternatives 1 and 2 would result in no impacts related to mudslides.

IOS Alternatives 1 and 2

Hydrology, water quality, and floodplain impacts from the implementation of IOS-1 and IOS-2 would be similar to those identified for Streetcar Alternatives 1 and 2, with the exception of the Old Pacific Electric Santa Ana River Bridge. The IOS Alternatives would not cross the bridge and have no potential to impact floodplains. Therefore, IOS-1 and IOS-2 would result in less-than-significant impacts related to hydrology and water quality.

3.14.4.2 Significance After Mitigation

As discussed in Section 3.14.3 above, Streetcar Alternatives 1 and 2 and the IOS Alternatives would be required to comply with BMPs to control potential water quality impacts. With implementation of the BMPs, the build alternatives would result in less-than-significant impacts related to hydrology and water quality.

3.15 Safety and Security

This section provides an overview of the safety and security of the operation of the streetcar system. The analysis is based on the affected environment and project features, and evaluates operational impacts associated with the proposed project. For an analysis of additional safety related issues, (i.e., air quality, hazards, and faults) see the corresponding environmental topic areas.

3.15.1 Affected Environment

The following schools within the Study Area are located in proximity to the proposed alignments:

- **Spurgeon Intermediate School.** The proposed alignment would be approximately 38.5 feet away from the school sidewalk.
- **Romero Cruz Elementary School.** The proposed streetcar alignment would be approximately 27.5 feet away from the school sidewalk.

- **George Washington Carver Elementary School.** The proposed streetcar alignment would be located adjacent to the school.
- **James Garfield Elementary School.** The proposed streetcar alignment would be approximately 27 feet away from the school sidewalk.

Law enforcement within the Study Area is predominantly within the jurisdiction of the Santa Ana Police Department (SAPD). The SAPD has 339 sworn law enforcement officers and is organized into four bureaus: Administration, Field Operations, Investigation, and Jail. The City of Garden Grove Police Department (GGPD) has 162 sworn law enforcement officers and 13 reserve officers. The police department provides services of approximately 18 square miles and is organized into three bureaus: Community Policing, Support Services, and Administrative Services.

Annual crime statistics are published in the Uniform Crime Reports conducted by the Federal Bureau of Investigation. A preliminary 2011 Annual Uniform Crime Report has been released for public viewing. This Report includes the number of offenses known to law enforcement agencies with a resident population of 100,000 and over.

For the City of Santa Ana, breakdowns of offenses are as follows: 1,313 for violent crime, 13 for murder, 62 for forcible rape, 591 for robbery, 647 for aggravated assault, 6,575 for property crime, 1,067 for burglary, 4,222 for larceny theft, 1,286 for motor vehicle theft, and 101 for arson. When compared to 2010 data, the number of offenses in 2011 has decreased except for larceny and motor vehicle theft. The following are approximate percent decreases for offenses reported between 2010 and 2011: 13 percent for violent crime, 54 percent for murder, 30 percent for forcible rape, 18 percent for robbery, 4 percent for aggravated assault, 0.08 percent for property crime, 4 percent for burglary, and 27 percent for arson. Larceny and motor vehicle theft has increased by 0.8 and 0.9 percent, respectively.²⁷

For the City of Garden Grove, breakdowns of offenses are as follows: 449 for violent crime, 4 for murder, 19 for forcible rape, 171 for robbery, 257 for aggravated assault, 3,387 for property crime, 717 for burglary, 2,242 for larceny theft, 428 for motor vehicle theft, and 17 for arson. When compared to 2010 data, the number of offenses in 2011 has decreased except for arson. The following are approximate percent decreases for offenses reported between 2010 and 2011: 17 percent for violent crime, 33 percent for murder, 14 percent for forcible rape, 7 percent for robbery, 22 percent for aggravated assault, 6 percent for property crime, 11 percent for burglary, 3 percent for larceny theft, and 7 percent for motor vehicle theft. Arson has increased by 24 percent.²⁸

The OCTA Transit Police Services is responsible for providing a safe commute for transit patrons and to ensure the security of OCTA property. Transit Police Services is staffed with Deputy Sheriffs and has maintained the safety and security of the OCTA buses, transit

²⁷ The Federal Bureau of Investigation, *Uniform Crime Reports*, <http://www.fbi.gov/about-us/cjis/ucr/crime-in-the-u.s/2011/preliminary-annual-ucr-jan-dec-2011/data-tables/table-4/table-4-alabama-california>, accessed July 17, 2012.

²⁸ *Ibid.*

centers, and PE ROW since 1993. Transit Police Services also collaborates with the OCTA Management Team and Coach Operators to address crime prevention strategies and crime-related issues on OCTA bus routes and PE ROW.

The Orange County Fire Authority (OCFA) provides fire protection services and emergency medical services throughout the City of Santa Ana. The OCFA operates ten fire stations in the City of Santa Ana. The nearest fire station to the Study Area is Fire Station No. 72, located at 1668 East 4th Street. Fire Station No. 72 is not located along the proposed alignment and is approximately 1.5 miles southeast of SARTC. The ten stations are well-distributed and meet the standard of a half-mile service radius and an average response time of two to three minutes. The Garden Grove Fire Department (GGFD) operates seven stations which provide fire protection services and emergency medical services. The nearest fire station to the Study Area is Fire Station No. 3, located at 12132 Trask Avenue. Fire Station No. 3 is not located along the proposed alignment and is approximately two miles north of the western terminus of the alignment. The average response time for GGFD is approximately 4.5 minutes. In addition, four hospitals are within 1.5 miles of the Study Area. This includes the Santa Ana Western Medical Center Trauma Center, which is located within the Study Area and is one of three trauma centers within Orange County. Emergency Response Plans for the Cities of Santa Ana and Garden Grove provide direction and guidance for officials and citizens in the event of an emergency.

The Study Area includes a federal building, which requires special security. The Ronald Reagan Federal Building and United States Courthouse is located within the Study Area at 411 West 4th Street. The building design incorporates various security features, including thick concrete walls and massive gridwork, as well as concrete bollards to prevent private vehicles from traveling adjacent to the Federal Building.

3.15.2 Environmental Consequences

3.15.2.1 No Build Alternative

The No Build Alternative includes existing conditions within the Study Area and adds future planned and funded transit and roadway improvement projects. Each of these future projects will be environmentally cleared through separate project-specific environmental documentation. The streetcar would not operate under this alternative, and there would not be new safety- or security-related issues. Existing conditions related to vehicular, pedestrian, and bicycle safety would not change and emergency response plans and procedures would not be affected. Therefore, the No Build Alternative would not result in adverse effects related to safety and security.

3.15.2.2 TSM Alternative

The TSM Alternative emphasizes low-cost improvements and operational efficiencies, such as focused traffic engineering actions, expanded bus service, and improved access to transit services. It may include some minor physical enhancements, such as improvements to transit stop amenities (e.g., bus benches). In addition to transit network improvements, the TSM

Alternative includes operational enhancements, such as improvements to bicycle and pedestrian circulation to promote safe, convenient, and attractive connectivity between transit system and surrounding neighborhoods and activity centers. An additional improvement under the TSM Alternative include shorter emergency vehicle response time due to intersection and signal improvements, and traffic signal improvements at existing congested locations along Santa Ana Boulevard and Civic Center Drive. The expansion of bus service may result in increased demand for security personnel; however, it is expected that Transit Police Services would continue to maintain the existing levels of safety and security of the OCTA buses, transit centers, and PE ROW. Transit Police Services would also continue to work with other agencies to address crime prevention strategies and crime-related issues on the expanded OCTA bus routes. These minor improvements would have no or negligible effect to safety and security impacts. Therefore, the TSM Alternative would not result in adverse effects related to safety and security.

3.15.2.3 Streetcar Alternatives 1 and 2

Public safety and security planning are major considerations in the development of rail transit projects. The following section evaluates streetcar activity, pedestrian safety, bicyclist safety, and fire hazards.

Safety

Streetcar Activity. Streetcar Alternatives 1 and 2 could potentially result in streetcar-to-streetcar collisions; collision with vehicles, pedestrians, and bicyclists; and streetcar derailment. Based on the distribution of seventeen fire stations and hospitals within the Cities of Santa Ana and Garden Grove and the emergency response times ranging from two to 4.5 minutes, the emergency services to address potential collisions would be adequate. Streetcar Alternatives 1 and 2 would comply with all federal and State mandates that affect rail safety. Specifically, the system will be required to meet the federal requirements of 49 CFR Part 659 and State requirements of CPUC General Order 164D. These regulations require fixed guideway systems to establish system safety and security programs. CPUC requires the preparation of a System Safety Program Plan and a System Security Program Plan, which provide the framework for safety and security programs. Based on the establishment of the safety and security programs, hazards and security threats will be identified and resolved. This would ensure that identified safety issues and security concerns are addressed prior to completion of the project. CPUC must then certify that the project is safe and secure before the project can be place in revenue service. Following construction of the project, the project would be operated in accordance with OCTA standard operating procedures, operator rules, and the emergency plan.

In addition, the proposed streetcars would operate at a slower speed when traveling within the downtown/civic, commercial, and residential areas. The average speed for streetcars traveling along the proposed alignment, which takes into account speed reductions at school zones, entering and exiting station areas, and complying with traffic control, would be approximately 11 miles per hour. Signals would be the primary method for accommodating

transitions between in-street and separated segments, offering a protected signal phase for the streetcar to enter and leave the roadway. Within the roadway, the proposed streetcars would operate similar to buses. In addition, a safety program would be developed for and administered to all streetcar operators. Despite these safety features, streetcar and passenger vehicle conflicts have been identified at schools located adjacent to the tracks. These locations include Spurgeon Intermediate School, Romero Cruz Elementary School, George Washington Carver Elementary School, and James Garfield Elementary School.

- **Spurgeon Intermediate School.** The proposed streetcar would travel on ballasted track in front of the school and would be approximately 38.5 feet away from the school sidewalk. Eastbound and westbound platforms would be situated at the Santa Ana Boulevard/Fairview Street intersection. The potential safety concern would be related to school children crossing the tracks when arriving and departing from the school.
- **Romero Cruz Elementary School.** The proposed streetcar would travel on embedded track in front of the school and would be approximately 27.5 feet away from the school sidewalk. The pick-up/drop-off area is accessed from both Santa Ana Boulevard and Forest Avenue. The potential safety concern would be related to school children being picked-up or dropped-off along Santa Ana Boulevard, which does not have a parking lane. Another potential concern would be related to passenger vehicles crossing the tracks to Santa Ana Boulevard while exiting the pick-up/drop-off area.
- **George Washington Carver Elementary School.** The proposed streetcars would travel on embedded tracks in front of the school. A 21.5-foot pick-up/drop-up area would be located between the school and the tracks. The potential safety concern would be related to passenger vehicles entering or exiting the pick-up/drop-off area in a random fashion in the front of the streetcar operations.
- **James Garfield Elementary School.** The proposed streetcars would be traveling on embedded tracks in front of the school and would be approximately 27 feet away from the school sidewalk. The pick-up/drop-off area is accessed from Brown Street. A proposed platform is also located in front and in between the pick-up/drop-off area. The potential safety concern would be school children crossing the tracks on Brown Street and passenger vehicles entering or exiting the school parking lot.

Each of these locations represents an area where streetcars could collide with a passenger vehicle. Therefore, without mitigation, Streetcar Alternatives 1 and 2 would result in adverse effects related to streetcar and passenger vehicle collisions.

Streetcar Alternatives 1 and 2 would include an O & M Facility to oversee streetcar operations. The O & M Facility would accommodate daily and routine vehicle inspections, preventative maintenance, unscheduled maintenance, and component updates. The proposed facility would also facilitate long-term component repair for the streetcars. These preventative measures would reduce the derailment risk associated with streetcar operations. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to streetcar derailment.

Pedestrian Activity. It is anticipated that pedestrians would use sidewalks, designated marked crossings, and signalized intersections when traversing the streetcar ROW. Signals would be located at all intersections and/or pedestrian crossings to allow for the safe movement of pedestrian and streetcars. Along portions of the alignment where the streetcar runs within its dedicated ROW (i.e., PE ROW or Westminster Avenue Bridge Structure) and within the maintenance facility, the alignment would be secured by fencing to minimize pedestrian encroachment. Other design features, such as pedestrian sidewalks, audible signals, designated marked crossings, and signalized intersections, would be provided at crosswalks and intersections along the streetcar corridor to further minimize safety challenges. There will be times that passenger traffic may increase due to downtown events (e.g., sporting events, concerts, etc.) or increase due to the proximity of facilities (e.g., schools, hospitals, parks and other public facilities). However, it is anticipated that the design features above would reduce additional pedestrian safety issues. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to pedestrian safety.

Streetcar Alternatives 1 and 2 would include construction of the Willowick Station, located between Westminster Avenue and the Santa Ana River, to allow future access when the Willowick golf course site is developed. Without the development of the Willowick Station, there are no public roadways that cross the proposed alignment within this segment. As an interim solution, a ten-foot walking path would be constructed on both sides of the fenced OCTA ROW to allow access from adjacent residential neighborhoods, located north and south of the ROW. The proposed walking path would be accessed from the two gates near Green Drive and the end of Clinton Street. The walking path would not be visible from public streets and from the rear yards of adjacent homes due to the height of a proposed masonry ROW wall. The walking path is proposed to be lighted. It is also proposed that there would be pedestrian crossings of the tracks immediately south of the station platform and approximately 350 feet north of the station platform.

However, the proposed design creates several safety concerns, including the following:

- Transit patrons would have to walk a long distance along a walking path that is not visible to the general public;
- The proposed lighting level along the walking path may create shadowed or dimly lit areas;
- Gates would be accessed by a pass key, which may trap transit patrons without a pass key or without immediate access to a pass key within the ROW;
- If no pass keys are needed at access gates, then it may be possible for non-residents to access the neighborhoods adjacent to the rear of the homes on isolated streets and walkways;
- Pedestrian crossings of the tracks, located north of the station platforms, may raise safety consideration for train operations; and
- Allowing pedestrian access into the OCTA ROW without fencing of the area directly to the tracks would potentially result in pedestrians crossing the tracks within the ROW.

Therefore, without mitigation, Streetcar Alternatives 1 and 2 would result in adverse effects related to pedestrian safety.

Bicycle Activity. In locations along the alignment and outside of the PE ROW, bicycles would operate in mixed-flow traffic under Streetcar Alternatives 1 and 2. Bicyclists would be expected to adhere to local regulations for road usage and would be responsible for following safety and traffic laws. Awareness measures would be implemented to generally advise bicyclists of the changes in the traffic pattern. For example, to minimize effects on bicyclists and the risk of accidents, Streetcar Alternatives 1 and 2 would include the installation of signage to direct bicyclists to exercise caution when crossing the embedded track where the streetcar operates in mixed-flow traffic. Under Streetcar Alternative 2, a striped bicycle lane would be provided along Civic Center Drive to protect bicyclist from streetcar operations. Further safety actions include streetcar visibility to bicyclist, slow operating speed, and signals at intersections. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to bicycle safety.

Fire Safety. Elements of Streetcar Alternatives 1 and 2, such as stations, passenger trains, operation and maintenance facility, and TPPS, have the potential to introduce new risk of fire and related hazards. To minimize such hazards, fire warning and/or suppression systems (e.g., sprinklers, emergency exits, and notification systems) may be included in the design. Streetcar Alternatives 1 and 2 would comply with National Fire Protection Association Code 130, which establishes minimum fire protection requirements for fixed guideway transit and passenger rail systems. This includes, but is not limited to, stations, train ways, emergency ventilation systems, vehicles, emergency procedures, communications, control systems, and vehicle storage areas. These features would substantially reduce fire hazards. In addition, the streetcar would travel within the existing street right-of-way with traffic and would not reduce emergency response times by causing delays. In addition, fire personnel would have access along the PE ROW to respond to potential emergencies. Therefore, the Streetcar Alternatives 1 and 2 would not result in adverse effects related to fire safety.

Emergency Response Time and Access. Streetcar Alternatives 1 and 2 would not alter emergency response times given the wide distribution of emergency facilities throughout the Study Area. Crossing gates for the streetcar would generally be down for a period of less than 30 seconds. It is likely that emergency vehicles would switch to the other side of the street particularly when there are median extensions. Should the at-grade crossing be inaccessible for a substantial duration, emergency vehicles could access multiple alternative routes within the Study Area based on the well-defined street grid. Therefore, the Streetcar Alternatives 1 and 2 would not result in adverse effects related to emergency response times and access.

Security

Criminal activity could occur on streetcars and at transit stations. Streetcar Alternatives 1 and 2 would include security-oriented design features, such as perimeter fencing around the selected O & M Facility Site. A Crime Prevention through Environment Design program would be implemented during final design that includes natural access control, natural surveillance,

territoriality, and maintenance to create a safety environment. Natural surveillance entails keeping activity and passengers visible at the stations and incorporating pedestrian-friendly designs that allow the general public, transit personnel, and transit riders to contribute to surveillance in and around the station area. In addition, all streetcar operators would participate in a safety/security training program and surveillance cameras may be installed inside streetcar vehicles. While transit police services would primarily focus on fare enforcement on streetcars and at stations, the police presence would also act as a deterrent for criminal activity. These design features, along with police security patrols, will substantially reduce the risk for criminal activities on streetcars, at transit stations, and at the selected O & M Facility Site. Therefore, the Streetcar Alternatives 1 and 2 would not result in adverse effects related to streetcar security.

The Ronald Reagan Federal Building and United States Courthouse is located within the Study Area. The eastbound alignment of Streetcar Alternative 1 borders this building on 4th Street. In addition, eastbound and westbound stations are located on the west side of Ross Street. Streetcar Alternative 2 borders this building on 5th Street, and an eastbound station is located on the west side of Ross Street. Outside the stations, streetcars would function in traffic similar to a bus and would pose no greater security risk to the Federal Building than existing buses (Refer to Section 3.10 (Traffic and Parking) for a discussion of driveway access). In addition, the project would be designed such that no station would be located within 300 feet of the Federal Building. Therefore, the Streetcar Alternatives 1 and 2 would not result in adverse effects related to federal building security.

3.15.2.4 IOS-1 and IOS-2

The assessment of safety and security for IOS-1 and IOS-2 is identical to the assessment presented above for Streetcar Alternatives 1 and 2. However, IOS-1 and IOS-2 would not include an alignment adjacent to Spurgeon Intermediate School and would not include pedestrian safety issues associated with the PE ROW and the Westminster Avenue Bridge Structure. The safety and security concern related to streetcars, pedestrians, operations and maintenance facility, and the Ronald Reagan Federal Building and United States Courthouse would be similar to that of Streetcar Alternatives 1 and 2. Therefore, without mitigation, IOS-1 and IOS-2 would result in adverse effects related to streetcar and passenger vehicle collisions.

3.15.3 Measures to Minimize Harm

Mitigation Measure **SAF1** would eliminate adverse effects related to safety for pedestrian during pick-up/drop-off times at schools within along the alignment. Mitigation Measures **SAF2** through **SAF6** would eliminate adverse effects related safety for pedestrian accessing the walking path.

To address safety concerns associated with schools, the following mitigation measures are recommended:

SAF1 Under Streetcar Alternatives 1 and 2 and the IOS Alternatives, the City of Santa Ana shall coordinate with the Santa Ana Unified School District and Santa Ana Police Department regarding safety at schools adjacent to the alignment. The collaborative effort between the City and interested parties shall develop and teach rail safety measures to students and parents. Other precautionary safety features shall include signs, gated crossing, and crossing and traffic signals to create a safe environment for parents and students during pick-up/drop-off times.

To address safety concerns for pedestrian accessing the walking paths, the following mitigation measures are recommended:

SAF2 The contractor shall install surveillance cameras along the pedestrian walking paths within the PE ROW and at pedestrian gates to adjacent neighborhoods. Police security personnel shall be responsible for surveillance camera monitoring.

SAF3 The contractor shall install emergency call boxes along the pedestrian walking paths within the PE ROW.

SAF4 The contractor shall design the lighting plan for the pedestrian walking paths within the PE ROW to eliminate shadows or dimly lit areas to the greatest extent feasible.

SAF5 Within the PE ROW, the contractor shall fence the track area, and appropriate signage and audible and visual warning devices shall be installed at gate openings.

SAF6 If Mitigation Measures **SAF2** through **SAF4** are considered infeasible, then the Willowick Station shall not be made operational by the contractor until an appropriate public access point from the PE ROW is created as part of the Willowick Public Golf Course redevelopment.

In addition, Streetcar Alternatives 1 and 2 and the IOS Alternatives would be required to comply with BMPs to ensure safe conditions. These BMPs are presented below as measures to minimize harm. With implementation of the BMPs, the build alternatives would not result in adverse effects related to safety and security.

- Streetcar station shelters shall be transparent and views shall not be obscured when looking out or from within a shelter facility.
- Each station shall be provided with closed-circuit security cameras that would be monitored by police security personnel.
- Emergency vehicle and law enforcement access shall not be impeded by streetcar operations.
- A safety and security training program shall be developed for and administered to all personnel that would operate streetcars in mixed-flow traffic.

3.16 Construction

This section provides an overview of the construction effects of the proposed project. The analysis is based on the affected environment and project features, and evaluates construction impacts associated with the proposed project related to visual quality; energy resources; traffic, circulation, and parking; hazardous materials; air quality; noise and vibration; and land use.

3.16.1 Affected Environment

Construction of either Streetcar Alternative 1 or 2 would take place on a segment-by-segment basis along the streetcar alignment, with the exception of the bridge structures and the O & M Facility. The duration of concentrated construction activities would be no more than six months at one location along the alignment. The construction approach would be the same for Streetcar Alternatives 1 and 2. Construction activities would include, but would not be limited to, site preparation, bridge structure construction, roadway and sidewalk reconstruction, laying streetcar track and embedded trackwork, and construction of an O & M Facility.

Construction hours would generally occur between 7:00 a.m. and 6:00 p.m., Monday through Friday. There are some exceptions, such as nighttime construction, where temporary street lane closures and utility work would be required. Project construction would follow the applicable local, State, and federal laws for building and safety. In addition, standard conditions would be included in project construction contracts to ensure consistency with applicable laws for traffic, noise, vibration, and dust control.

The following description summarizes the construction approach and methods that have been defined for the project at this preliminary stage of conceptual design:

- In general, all construction of tracks would be within the existing PE ROW, existing streets, or proposed future streets;
- Construction of the O & M Facility would be within one of the designated sites along the alignment, as defined in the project description as O & M Facility Sites A and B;
- The construction period is anticipated to be approximately 30 months, with major activities to be completed within the first 24-month period;
- It is anticipated that the construction activities would be staged and sequenced based on location and types of construction. The likely staging of the proposed project would include four to five segments to allow for construction crews to work in sequence, moving one team to a new location, while the next team takes over the next set of activities; and
- Two potential areas are identified as construction staging and track laydown areas:
 - The east end of the PE ROW at Raitt Street would be used as a temporary construction and welding plant and material storage sites. This location would serve as the midpoint of distribution to both east and west directions of the alignment. The welding plant would be a combined operation of flash butt welding and laydown storage to produce designated length of rail ribbons to be dragged or truck-hauled into position for embedment or attachment to ties; and

- The second area is identified as land owned by the City of Santa Ana, located at the corner of 6th and Santiago Streets. Some special trackwork and pre-curved rails could be stored at this location;
- Construction of the proposed project would require the relocation of one catch basin under Alternative 2 at Flower Street and Civic Center Drive in addition to the installations of approximately 50 new catch basins to improve drainage along the alignment.

Construction Scenario

The project would use conventional construction techniques and equipment typical to the Southern California region and follow all applicable federal, State, and local laws for building and safety. Working hours would be varied to meet special circumstances and restrictions. Customary local practices consistent with all applicable laws would be used to control traffic, noise, vibration, erosion, and dust during construction. Design and construction would include mitigation commitments. Generally, construction would be divided into a series of often overlapping activities to minimize the construction duration and associated impacts. **Table 3.16-1** depicts a typical construction activities sequencing for an LRT project of similar scope and complexity.

Construction equipment would include graders, bulldozers, cranes, drill rigs, excavators, concrete-batching equipment, pumping equipment, concrete trucks, flat bed trucks, dump trucks, and rail-mounted equipment. While the final construction approach, including methods, staging, and sequencing coordination, will be determined in detail with the construction contractor, who has yet to be selected, the following describes the likely sequencing of the major construction activities. It should be noted that most of these activities overlap.

- Early work activities would include relocation of some of the private and public underground utilities identified as being in conflict with the track alignment;
- Work on the new bridge structure at Westminster Avenue and for the new Santa Ana River bridge structure would also begin early in the construction period;
- Demolition and clearing of the selected O & M Facility site would begin in the early phase of construction in order to be available for receipt and testing of the vehicles. Construction of the maintenance facility yard would also likely commence at this time;

TABLE 3.16-1: TYPICAL CONSTRUCTION SEQUENCE AND AVERAGE CONSTRUCTION TIME

Activity/a/	Tasks	Average Time Required (months)
Preconstruction	Locate utilities; establish right-of-way and project control points and centerlines; establish and relocate survey monuments	2 – 4
Site Preparation	Establish environmental controls and install soil and erosion-control measures; relocate utilities and clear and grub right-of-way (demolition); establish detours and haul routes; erect safety devices and mobilize special construction equipment; prepare construction equipment yards, and stockpile materials	3 – 6
Heavy Construction	Construct aerial structure, retaining walls, trackbed drainage, at-grade guideway, soil stabilization, pile caps/foundations, abutments, bents, and dispose of excess material	12 – 16
Medium Construction	Lay track, construct stations, install off-site drainage, and construct elevated station enclosures	6 – 12
Light Construction	Finish work, install systems elements (electrical, signals, and communication), street lighting where applicable, traffic signals, signing and striping, landscaping, close/remove detours, and clean up and test system	3 – 9
Pre-Revenue Service	Test vehicles, power, communication, signaling, train operators and maintenance personnel	1 – 3

/a/ Some of these activities would be conducted in parallel.

Source: Terry A. Hayes Associates Inc., 2012.

- Some profile grade leveling, clearing, and grubbing of the PE ROW would take place during the early stages to establish grade for the ballast track sections. The duration of this activity would be two to three months;
- Prior to initiating work on the ballast track, overhead contact wire pole foundations and station foundations would be constructed to grade level. In addition, structure approach slabs, underground utilities, or subsurface structures would be constructed prior to the laying of the ballasted sections;
- Track construction would begin next for the in-street and the non-structure ballasted sections of the streetcar trackway. The steps would involve setting up the reinforcement for the concrete slab, placing the rail, boots, and ties and finally pouring track slab concrete. The following construction activities would also occur during the same 24-month timeframe as track construction:
 - Preparation for substation sites and installation of conduits, grounding mats, and substation foundations.
 - Track construction activity, including installation of special trackwork, field welds, installation of insulated joints and other special trackwork material.
 - Sidewalk improvements, platforms, pavement grading and resurfacing to the limits of the project between Raitt Street and SARTC.
 - Foundation work for new traffic signal, lighting, and overhead contact wire poles.

- Roadway grinding and overlay operations beginning at Raitt Street and advancing eastward along the alignment; and
- The final steps of the construction work would include pavement striping, reestablishing ROW temporarily impacted by construction, landscaping, system testing, lining and surfacing of the ballasted track, and other miscellaneous finishing.

3.16.2 Environmental Consequences

The following section addresses the construction-related effects based on the implementation of the construction scenario described in the preceding section. Topics addressed in this section include the following:

- Land Use and Zoning
- Land Acquisition and Displacements
- Community Effects and Environmental Justice
- Visual Quality
- Cultural Resources
- Geology, Soils, and Seismicity
- Hazardous Materials
- Traffic, Circulation, and Parking
- Noise and Vibration
- Air Quality (GHG emissions are addressed in the CEQA analysis)
- Energy Resources
- Water Quality, Hydrology, and Floodplains
- Safety and Security

Construction effects to recreational areas are described under temporary occupancy of the Section 4(f) analysis described in Section 3.4.

3.16.2.1 No Build Alternative

The No Build Alternative includes existing conditions within the Study Area and adds future planned and funded transit and roadway improvement projects. Each of these future projects will be environmentally cleared through separate project-specific environmental documentation. The streetcar would not operate under this alternative and there would not be project-related construction impacts. Therefore, the No Build Alternative would not result in adverse effects related to construction.

3.16.2.2 TSM Alternative

The TSM Alternative emphasizes low-cost improvements and operational efficiencies, such as focused traffic engineering actions, expanded bus service, and improved access to transit services. It may include some minor physical enhancements, such as improvements to transit stop amenities (e.g., bus benches). Construction activity under the TSM Alternative would not require substantial land acquisition and displacement, affect visual environment, damage cultural or historical resources, disrupt community cohesion and character, or

disproportionately affect minority and low-income populations. Construction activities would require construction vehicles and associated fuel consumption. Fuel consumption during the construction activity would lead to greater savings in fuel consumption for future operations. Therefore, the TSM Alternative would not result in adverse effects related to construction.

3.16.2.3 Streetcar Alternatives 1 and 2

Land Use and Zoning

Streetcar Alternatives 1 and 2 construction activities may require temporary easements but would not affect zoning or surrounding land use compatibility. Two potential areas are identified as construction staging and track lay down areas. One site is the east end of the PE ROW at Raitt Street, which is adjacent to industrial land uses. The second site is at the corner of 6th and Santiago Streets, which is in an area zoned for industrial land uses. The staging of equipment, and the stockpiling or hauling of dirt and materials would be temporary and would not affect the land use compatibility with the surrounding primarily industrial area. Therefore, Streetcar Alternatives 1 and 2 construction activities would not result in adverse effects related to land use and zoning.

Land Acquisition and Displacements

Many transit projects require construction easements for the temporary staging of equipment and materials during construction. Property used temporarily during construction is returned to the property owner once construction is complete. Streetcar Alternatives 1 and 2 construction activities would not require additional land acquisition or displacement beyond those properties identified for project implementation. Therefore, Streetcar Alternatives 1 and 2 construction activities would not result in adverse effects related to land acquisition or displacement.

Streetcar Alternative 1 or 2 construction activities would have temporary economic effects in the Study Area and the region. One temporary effect would be the increase in economic activity due to project-related spending (i.e., purchases of goods and services required for construction and employment of workers needed for construction). The increased economic activity would prompt secondary economic activity as a portion of the construction-related revenue and employee compensation is re-spent in sectors throughout the local and regional economy. The extent of the economic effect of construction-related expenditures on the local and regional economy would depend largely on the proportion of construction expenditures that would occur in the local and regional area and on the residential location of persons employed by the construction contractors. It is anticipated, that the capital expenditure for the project would yield approximately 1,900 annual jobs throughout the region. Of these there would be approximately 100 annual construction jobs directly associated with the proposed project.

It is expected that the size of the regional labor force would be sufficient to construct Streetcar Alternative 1 or 2 and the regional labor force would likely benefit. State and local governments would benefit from income taxes paid on the project construction force wages.

However, the magnitude of the construction activities is relatively small compared to regional construction activities and so it is not expected that the labor expenditures would result in net new expenditures for construction labor. Therefore, it is unlikely that State and local governments would see a substantial increase in income tax revenues.

The purchase of materials and supplies would include gravel, asphalt, concrete, track rails, and architectural materials for the station structures, and signage. Most of these materials and supplies would be expected to be purchased within Orange County, and where not, most likely within the Southern California region. The purchase of these materials and supplies would include the payment of sales tax, which would be revenue distributed to the State and local governments. The amount of materials and supplies required for the proposed project, however, is relatively small compared to all construction projects that would be ongoing in the region. As such, it is unlikely that the State or local governments would see a substantial increase in sales tax revenues.

For business owners and commercial property owners, the disruption of construction activities would similarly involve multiple construction crews operating along the corridor simultaneously. Construction activities would inconvenience and disturb area employees, business operations, and business customers. Temporary construction effects would include:

- Presence of construction workers, heavy construction equipment, and materials
- Use of short-term reduction in number of roadway travel lanes, road closures, traffic diversions, and modified access to properties
- Loss of parking, especially on-street parking
- Increase in airborne dust
- Increase in noise and vibration from construction equipment and vehicles
- Decreased visibility and change in customer access to businesses

Access to businesses would be maintained during business operating hours and signage would be posted alerting nearby businesses of temporary closures and/or detours. The Traffic Management Plan described below would alert nearby businesses to temporary closures, and detours and maintain access during business hours. Temporary economic effects in the Study Area and the region during construction of Streetcar Alternative 1 or 2 would not be considered adverse. Therefore, Streetcar Alternatives 1 and 2 construction activities would not result in adverse effects related to economic effects.

Community Effects and Environmental Justice

All of the neighborhoods within the Study Area are considered EJ populations; therefore, the impacts to communities also characterize the impacts to EJ populations. The traffic control plans will be designed to avoid detours that would encourage drivers to travel through the interior of adjacent communities and neighborhoods. A comprehensive community outreach program would be developed prior to the start of construction activities. Construction equipment would be concentrated near staging areas, away from sensitive receptors. Haul trucks would be concentrated in the western portion of the alignment along the PE ROW where the movement of soil would be required for the construction of bridges across Westminster and the Santa Ana River. The haul routes would primarily use Westminster

Avenue and Harbor Boulevard, before accessing the SR 22 and would not travel within residential neighborhoods or disrupt community access. These Construction effects would be short-term and of temporary duration. Therefore, Streetcar Alternatives 1 and 2 construction activities would not result in disproportionate adverse effects related to community cohesion and character.

Visual Quality

Scenic and unique views within both Streetcar Alternatives 1 and 2 include the Old Pacific Electric Santa Ana River Bridge, Santa Ana River Trail, Sascuer Park, Downtown Santa Ana Historic District, and SARTC. Construction of Streetcar Alternatives 1 and 2 would involve temporary and/or minor visual changes to the built environment. Temporary lighting may be necessary for nighttime construction of certain project elements or in existing right-of-way (to minimize disruption to daytime traffic). This temporary lighting may potentially affect residential areas by exposing residents to glare from unshielded light sources or by increasing ambient nighttime light levels. Project design features are included to eliminate adverse light and glare. All approved lighting will be energy-efficient, and shielded or recessed so that direct glare and reflections are confined to the maximum extent feasible within the boundaries of the site, and will be directed downward and away from adjoining properties and public right-of-way. The City will ensure that construction lighting will not blink, flash, or be of unusually high intensity or brightness. Project plans will be reviewed and approved by City Staff for compliance with these features prior to the issuance of building permits. Therefore, Streetcar Alternatives 1 and 2 construction activities would not result in adverse effects related to visual quality.

Cultural Resources

The Study Area does not include archeological or paleontological resources eligible for listing in the National Register of Historic Places. Ground disturbance would not be more than five feet beneath the existing surface in most areas although ground disturbance may exceed five feet to accommodate drainage improvements near Raitt Street and for foundations for elevated structures across Westminster Avenue and the Santa Ana River. These areas are all located in previously disturbed areas with underground infrastructure that are along the street ROW or across a concrete channel, and the potential for the accidental discovery of archeological or paleontological resources is remote. However, discovery of archaeological resources is possible during excavation activities. Mitigation Measure **CR1**, described below, would be implemented to insure no adverse impact would occur to archaeological resources. Therefore, Streetcar Alternatives 1 and 2 construction activities would not result in adverse effects related to archeological or paleontological resources.

Sixty-eight properties evaluated in the Study Area were found to be eligible for the National Register of Historic Places. In each case but one (Old Pacific Electric Santa Ana River Bridge), short-term construction activities would be sufficiently distant that there would be no risk of physical damage to these historic properties. Under Section 106, "change of the character of the property's use" and "neglect of a property which causes its deterioration" both would be considered an "adverse effect" if they were to occur during construction. For the bridge, the potential exists for damage to occur to the bridge when the new single-track bridge is

constructed adjacent to the south of the existing bridge or when the western abutment of the bridge is modified to connect to the reconfigured western edge of the Santa Ana River channel which will allow for the new bridge to be grade-separated from the trail. During final design, a qualified structural engineer would survey the existing foundation, western abutment, and other structural aspects of the Pacific Electric Santa Ana Railroad Bridge and will provide measures to protect the historic bridge from potential damage. A discussion of the potential noise and vibration effects to historic structures is further discussed below under Noise and Vibration. For example, sonic pile driving or caisson drilling may be recommended instead of pile driving. Vibration isolators or structural damping, may be required at footings of the vertical columns of the straddle bents to ensure that vibration effects remain below the FTA threshold of 0.12 PPV inches/second for historic structures. Therefore, the Old Pacific Electric Santa Ana River Bridge would be unlikely to experience physical damage, a change of the character of the property's use, or physical deterioration during construction and no adverse effect would occur.

For the other properties, proposed construction activities generally would require conventional earthwork equipment (e.g., cranes; tractors; and haul, concrete, and pick-up trucks). Drill rigs and similar vibration-generating equipment also would be used. The distances between the construction equipment and properties would typically be sufficient to avoid affects to the properties as a result of vibration or other activity that could affect these buildings' structural integrity. However, as discussed below in the noise and vibration analysis, six historic structures have been identified as potential locations of vibration impacts. Therefore, without mitigation, Streetcar Alternatives 1 and 2 construction activities would result in adverse effects related to historic resources.

For long-term effects to historic architectural resources refer to Section 3.7 (Cultural Resources).

Geology, Soils, and Seismicity

There is no evidence of a known fault surface rupture expressed in the regional geomorphology and available historic aerial photographs. Given that there are no mapped Earthquake Fault Zones within the Study Area, the potential for fault rupture is low. In addition, the Study Area is relatively flat and would not be susceptible to landslides. The infrequency of earthquakes with magnitudes sufficient enough to trigger seismic hazards and the temporary construction duration means that the risk of a seismic related hazard occurring during construction would be extremely low. Therefore, Streetcar Alternatives 1 and 2 construction activities would not result in adverse effects related to fault rupture and landslides.

The Study Area is mostly underlain by late Quaternary-aged alluvial deposits, which could potentially be subject to strong seismic ground shaking. Project construction activities would not be affected by compressible, corrosive, and expansive soils. Geotechnical and geologic studies would continue to be conducted through final project design, and these studies would identify potentially unstable soils, including areas susceptible to landslide and subsidence. Through soil borings during final design, the project would conduct additional geotechnical and geologic analysis, especially for areas near locations of planned bridges, the aerial guideway, retaining walls, and stations. The information would be used in developing

detailed design and construction plans. The construction plans and specifications would incorporate this information to minimize risks. Additionally, the worker health and safety plan would reduce risks associated with naturally occurring disasters.

Construction activities could cause temporary increased soil erosion and soil instability. The design of the proposed project would include establishing and implementing standard conditions of approval that are required by the City of Santa Ana, including those areas with potentially unstable soils that are susceptible to landslide and subsidence. The following measures would be applied during construction activity to reduce potential effects to runoff during construction:

- Hydroseeding of slopes
- Planting mulch
- Bonded fiber matrix
- Geosynthetics
- Fiber rolls

Adherence to these requirements would prevent substantial on-site erosion, and minimize soil erosion and topsoil loss. With the implementation of the above project features and adherence to design requirements, there would be no adverse effects on regional geologic or seismic conditions as a result of project construction activities. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to geology, soils, and seismicity.

Hazardous Materials

A total of 32 properties were identified as potential hazardous sites. The majority of potentially hazardous properties would not be acquired or disturbed and do not require further investigation. However, one property identified as a potentially hazardous site would be acquired as part of O & M Facility Site A and three properties identified as potentially hazardous sites would be acquired as part of O & M Facility Site B. O & M Facility Site A includes Madison Materials located at 1035 East 4th Street. O & M Facility Site B includes All Car Auto Parts located at 2002 West 5th Street and SA Recycling located at 2006 West 6th Street, and American Auto Wrecking located at 1908 West 5th Street. In accordance with regulatory requirements (e.g., the State Department of Toxic Substances Control), the City of Santa Ana would survey the affected parcels along the alignment and conduct soils tests at the selected O & M Facility Site and in areas of the alignment where recognized environmental conditions have been identified or where acquisition or excavation will be required for construction. Testing at these locations would be required during Preliminary Engineering and prior to project construction. Additional testing at those sites identified would require oil and ground water samples be gathered and stained soils and above ground storage tanks would be safely disposed. As required, remediation, including the proper disposal of contaminated soil or groundwater, shall be conducted in accordance with State laws and regulations. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to hazardous materials.

In addition, construction activities would involve demolition, excavation, the use, storage, and transport of hazardous materials (e.g., fuel and oil) associated with construction equipment. Construction activities would be unlikely to create accident conditions involving the release of hazardous materials or waste. The project would prepare a site-specific safety plan to address potential hazards that could be encountered during construction activities. All hazard materials would be properly disposed of in accordance with state and federal regulatory requirements. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to the use, transport or storage of hazardous materials.

There is the potential that Streetcar Alternative 1 or 2 construction activities may result in exposure to asbestos containing materials (ACMs) or lead based paint (LBP). These hazards are most likely to be encountered at various locations of full and partial acquisitions and during the construction of the proposed O & M Facility Site A or B. Yellow thermoplastic pavement markings and other types or colors of street or municipal markings may contain LBP. ACM and LBP exposure, along with contaminate groundwater, represent potential hazards. As required by regulatory agencies, asbestos and lead based paint surveys would be conducted on all sites where structures would be demolished or significantly renovated. Removal of identified asbestos or lead paint would be conducted in accordance with State law and requirements. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to ACM and LBP.

Traffic, Circulation, and Parking

Streetcar Alternative 1 or 2 construction activities would be staged and sequenced based on location and types of construction. Staging for the proposed project would include four to five segments to allow construction crews to work in sequence, moving one team to a new location while the next team takes over the next set of activities. It is also anticipated that construction impacts would be localized for the duration of the construction. The duration of the localized impacts would likely be no more than approximately six months in one location and widespread disruptions to circulation in the streetcar construction area are not anticipated.

It is expected that construction would generally occur in the right-most travel lane and in the direction of travel where the streetcar is being constructed. Construction would also occur in close proximity to the sidewalks of the roadways on which the streetcar is being constructed. Roadway lane and some sidewalk closures, as well as the loss of on-street parking, would occur. Sidewalk closures would generally be limited to the areas immediately surrounding the proposed streetcar stations. Roadway lane closures and parking loss would occur along the street-running portion of the alignment within the segments of construction. The duration of roadway disruption due to installation of rails in the roadbed would vary, depending on the construction material specified and the method of construction.

Construction-related effects on traffic, circulation, and parking, which are expected to be short-term and temporary, are expected to include the following:

- Periodic and/or intermittent closure of roadway travel lanes, resulting in reduced roadway capacity due to construction related activities

- Periodic and/or intermittent closure of roadway sidewalks, resulting in restricted pedestrian travel due to construction related activities
- Periodic and/or intermittent loss or reduction of parking resulting in restricted access to businesses and residences due to construction related activities
- Short term, temporary blockage of driveways and limited access to businesses and residences in the immediate vicinity of active construction activities
- Increased Truck traffic related to construction activities
- Potential for temporary diversion of traffic from primary travel routes in the construction area, into residential areas, and other secondary travel routes
- Wherever the streetcar alignment crosses a perpendicular street, operations of the entire intersection would be adversely impacted on a temporary basis

As a Standard Condition of Approval required by the City of Santa Ana, Streetcar Alternatives 1 and 2 would implement a Traffic Management Plan (TMP) that reduces construction-related effects along the alignment and at the chosen O & M Facility site. The TMP would:

- Identify potential types of traffic control that may have a real or perceived business impact such as short term lane closure, extended full street closures, detours, driveway impairment, or sidewalk closures;
- Consider sequenced construction to reduce localized effects to the greatest extent feasible;
- Minimize lane closures during AM and PM peak hours;
- Investigate the feasibility of performing construction activities in business areas during nighttime hours to minimize impacts during regular daytime business hours;
- Minimize sidewalk closures;
- Consider bicycle and pedestrian travel;
- Maintain access to businesses at all times except for minor temporary driveway closures;
- Designate parking areas for construction personnel;
- Designate haul routes for truck traffic;
- Minimize unnecessary heavy vehicle idling in construction zones;
- Plan temporary traffic detours to minimize traffic diversion into residential areas; and
- Identify methods to expedite construction in roadway intersections to reduce instances where multiple streets are impacted simultaneously.

In addition, the City of Santa Ana requires projects to notify residents, business owners, commuters, and government agencies, and residents at least ten days prior to parking removal, lane closure, and street closures that may affect these groups. With implementation of the TMP and the public notification process, Streetcar Alternatives 1 and 2 would not result in adverse effects related to traffic, circulation, and parking.

Noise and Vibration

Noise. The FTA Transit Noise and Vibration Impact Assessment guidance document provides construction noise criteria by land use type during both daytime and nighttime hours. This guidance was utilized to assess construction noise. Streetcar Alternatives 1 and 2 would be constructed over approximately 30 months. With the exception of the bridge structures and

the O & M facility, construction would take place on a segment-by-segment basis along the streetcar alignment, and the duration of concentrated construction activities would be approximately six months within the individual segments.

The Santa Ana Municipal Code limits construction activity to between 7:00 a.m. and 8:00 p.m. and the City of Garden Grove Municipal Code limits construction activity to between 7:00 a.m. and 10:00 p.m. Construction activities associated with Streetcar Alternatives 1 and 2 would generally occur between 7:00 a.m. and 6:00 p.m., Monday through Friday. However, nighttime construction between 10:00 p.m. to 7:00 a.m. may occur when temporary street lane closures and utility work are required. Nighttime construction noise has been included in the following assessment of general construction activity and bridgework. The Transit Noise and Vibration Impact Assessment guidance document identifies residential construction noise criteria as 90 dBA Leq during daytime hours and for residences and 80 dBA Leq during nighttime hours. The construction criteria for commercial and industrial land uses are 100 dBA Leq during daytime and nighttime hours.

Alignment Construction Noise. Pieces of construction equipment, which could be employed along the length of the streetcar alignments and which exhibit high noise levels, include the following items: mounted impact hammer, foundation driller (auger drill rig), pneumatic tools, concrete pump truck, and pavement miller or scarifier. The noise analysis was based on an impact hammer (90 dBA) and a foundation driller, pneumatic tool, or concrete pump truck (85 dBA each) operating simultaneously at full power for one hour. When two of those types of equipment (90 dBA and 85 dBA) are running together at full power for one hour, the noise level would be 91 dBA at 50 feet. For residences, the 90-dBA daytime impact criteria would be exceeded at locations within 60 feet of the centerline of the project alignment. **Table 3.16-2** shows that construction noise levels would be exceeded at multiple residences under Streetcar Alternatives 1 and 2.

For commercial and industrial land uses, the 100-dBA daytime impact criteria would be exceeded at locations that within 17 feet of the centerline of the project alignment. It is not anticipated that these land uses would be located within 17 feet of the centerline along any point of the alignment.

The nighttime noise impact criterion is 80 dBA Leq for residential land uses and 100 dBA Leq for commercial and industrial land uses. As explained above, it is not anticipated that construction activity would affect commercial and industrial land uses. However, nighttime construction noise levels would exceed the impact criteria when located within 175 feet of residential land uses.

Bridge Construction Noise. One of the loudest pieces of equipment that would be used for construction is an impact pile driver. Pile driving activities would be limited to the elevated crossing over Westminster Avenue and where the alignment crosses the Santa Ana River channel. Calculations performed for the two bridge sites show that only the residential land uses in NSA-3, located just west of the Santa Ana River channel, would be impacted by pile driving activities. It is anticipated that commercial and industrial land uses near the

Westminster Avenue bridge structure would also be exposed to pile driving noise levels that exceed the impact criterion.

Vibration. Ground vibration from construction activities depends on construction equipment and the type of soil in the vicinity of the construction site. According to the Transit Noise and Vibration Impact Assessment guidance document, ground vibrations from construction activities rarely reach the levels that can damage structures, but they can achieve audible and perceptible ranges in buildings located very close to the site. The impact threshold regarding building damage is 0.2 PPV (in/sec) for residential buildings, 0.5 PPV (in/sec) for institutional buildings, and 0.12 PPV (in/sec) for historic structures. The impact threshold regarding human annoyance is 72 VdB for residences and buildings where people normally sleep and 75 VdB for institutional land uses with primarily daytime uses.

TABLE 3.16-2: CONSTRUCTION NOISE LEVELS – WITHOUT MITIGATION						
NSA	Rec.	Streetcar Alternative 1		Streetcar Alternative 2		
		Noise Level at Receiver (dBA)	Impact	Noise Level at Receiver (dBA)	Impact	
3	R5	89	No	89	No	
	R6	90	Yes	90	Yes	
	R7	91	Yes	91	Yes	
6	R10	90	Yes	90	Yes	
7	R12	91	Yes	91	Yes	
8	R13	90	Yes	90	Yes	
11	R16	92	Yes	92	Yes	
	R18	91	Yes	91	Yes	
	R20	91	Yes	91	Yes	
12	R21	90	Yes	90	Yes	
13	R22	90	Yes	90	Yes	
14	R23	90	Yes	90	Yes	
	R25	90	Yes	90	Yes	
	R26	91	Yes	91	Yes	
	R27	90	Yes	90	Yes	
	R28	90	Yes	90	Yes	
15B	R30	90	Yes	86	No	
15C	R33	90	Yes	83	No	
	R34	84	No	93	Yes	
	R35	N/A	N/A	90	Yes	
	R37	N/A	N/A	90	Yes	
15E	R42	97	Yes	N/A	N/A	
	R43	99	Yes	99	Yes	
	R44	90	Yes	90	Yes	
	R45	N/A	N/A	94	Yes	
	R50	90	Yes	N/A	N/A	
17	R47	N/A	N/A	92	Yes	
	R49	N/A	N/A	93	Yes	
	R55	N/A	N/A	91	Yes	
	R56	103	Yes	N/A	N/A	
	R58	N/A	N/A	93	Yes	
	R59	N/A	N/A	91	Yes	
19	R46	90	Yes	N/A	N/A	
	R51	93	Yes	N/A	N/A	
	R52	93	Yes	N/A	N/A	
	R54	N/A	N/A	96	Yes	
	R60	93	Yes	N/A	N/A	
	R69	91	Yes	N/A	N/A	

	R70	N/A	N/A	95	Yes
20	R64	N/A	N/A	91	Yes
21	R65	90	Yes	88	No
	R66	92	Yes	95	Yes
	R67	N/A	N/A	103	Yes
	R68	83	No	90	Yes

N/A: Not Applicable to Alternative

Refer to Section 3.11 (Noise and Vibration) for identification of Noise Sensitive Areas (NSA) and receivers).

Source: URS Corporation, updated by Terry A. Hayes Associates Inc, Noise and Vibration Technical Report, February 2012.

Alignment Construction Vibration. It is anticipated that a vibratory roller would generate the highest vibration levels, other than pile driving. A road roller (sometimes called a roller-compactor or just roller) is a compactor type engineering vehicle that is often used to compact soil, gravel, concrete, or asphalt in the construction of roads and foundations. Road rollers use the weight of the vehicle to compress the surface being rolled (static) or use mechanical advantage (vibrating). While smaller in size as compared to the pile driving equipment, a vibratory roller would potentially be employed along the length of the alignments for Streetcar Alternatives 1 and 2. This assessment of construction vibration took into account the potential for building damage during project construction. The following identifies land uses that would potentially be exposed to damaging vibration levels:

- *Residential Structures.* Under Streetcar Alternative 1, residential structures represented by R56 that are located very close to the existing streetcar alignment (within 26 feet) would be impacted due to construction activities. Under Streetcar Alternative 2, R67 falls within this threshold and would also be impacted.
- *Historic Structures.* As shown in **Table 3.16-3**, there are seven historic structures that would be potentially impacted by use of construction equipment, such as a vibratory roller, given their close proximity to the proposed streetcar alignments. During final design, a qualified structural engineer shall survey the existing foundation and other structural aspects of the Pacific Electric Santa Ana Railroad Bridge and buildings located within close proximity of the construction zone boundaries. Pot holing or other non-destructive testing of the below grade conditions may be necessary to establish baseline conditions. Depending on anticipated construction activities, the survey report will identify buildings that could be affected by construction vibration. The qualified structural engineer shall document in the survey report baseline conditions at all buildings that may be affected by construction vibration.

TABLE 3.16-3: CONSTRUCTION VIBRATION IMPACT AT HISTORIC STRUCTURES

Address	Construction Year	Structure Use	Structure Type	Distance (feet)	Associated Alternative
624 French St.	1895	Institutional	Stucco	9	Alt 1/Alt 2
600 Main St.	1937	Institutional	Stucco	13	Alt 1
507 Minter St.	1906	Residential	Wood Siding	16	Alt 2
203 and 205 Civic Center Dr.	1923	Institutional	Concrete	18	Alt 2
1302 Santa Ana Blvd.	1947	Commercial	Stucco	20	Alt 1/Alt 2
501 5 th St.	1921	Residential	Wood Siding	22	Alt 1/Alt 2
PE Santa Ana River Bridge	1905	None	Steel-framed	4	Alt 1/Alt 2

Source: URS Corporation, updated by Terry A. Hayes Associates Inc, Noise and Vibration Technical Report, February 2012.

The survey report shall provide a shoring design to protect identified structures from potential vibration damage. Alternatively, the structural engineer may recommend alternative construction methods that would produce lower vibration levels. For example, sonic pile driving or caisson drilling may be recommended instead of pile driving.

These survey report documenting baseline conditions shall be forwarded to the lead agency and to the mitigation monitor prior to approval and issuance of local government construction permits. For the Santa Ana River Bridge, vibration isolators or structural damping, may be required at footings of the vertical columns of the straddle bents to ensure that vibration effects remain below the FTA threshold of 0.12 PPV (in/sec) for historic structures identified in the FTA Transit Noise and Vibration Impact Assessment document.

Refer to the Noise and Vibration Technical Report included as Appendix J for a more detailed discussion of construction vibration, including potential impacts to historic resources.

- *Institutional Structures.* Other than the three historic structures noted as above as being used for industrial land uses, no institutional buildings along the alignment would be impacted by vibration due to construction activities.

Regarding vibration annoyance, nearly all the sensitive receptors near the streetcar alignments within the Study Area would be impacted by construction activities. Residential land uses which fall within 145 feet of the streetcar alignment would be impacted and institutional land uses which fall within 115 feet of the streetcar alignment would be impacted.

Bridge Construction Vibration. The pile driving vibration analysis indicates that for building damage, residences located within 100 feet of the bridge sites would be potentially impacted by pile driving. For human annoyance, residences within 560 feet would be potentially impacted. No residential buildings would be located within 100 feet of pile driving locations. However, R1 and R7 in NSA-1 and NSA-3, respectively, would be located within 560 feet of each of these proposed bridge sites and, therefore, can reasonably be expected to be affected (human annoyance) by pile driving activity at the bridge locations.

- A Noise and Vibration Control Plan will be developed and implemented prior to construction that will include the following best management practices to minimize exposure to high levels of noise and vibration and ensure compliance with construction noise and vibration criteria listed in the FTA Transit Noise and Vibration Impact Assessment guidance document. This includes ensuring that vibration levels at historic structures do not exceed 0.12 inches per second peak particle velocity.
- Construction equipment shall have state-of-the-art and properly maintained muffler systems air-inlet silencers, where appropriate, as required by State and federal regulations. Mobile or fixed “package” equipment (e.g., arc welders, air compressors) will be equipped with shrouds and noise-control features that are readily available for that type of equipment.
- Noisy stationary construction equipment, such as compressors, shall be placed as far as practicable from residences.
- Grading and construction equipment shall be shut down when not in use for an extended period of time.
- Material stockpiles and mobile equipment staging, parking, and maintenance areas shall be located as far as practicable from noise-sensitive receptors.
- Where pile-driving operations are required, vibratory pile driving or pre-drilled pile insertion techniques shall be used whenever possible, rather than impact pile driving.
- The construction contractor shall manage construction phasing (scheduling demolition, earthmoving, and ground-impacting operations so as not to occur in the same time period), use low-impact construction technologies, and shall avoid the use of vibrating equipment where possible to avoid construction vibration impacts. Specifically, contractors shall use smaller and lower impact construction technologies where residential and historic structures are located within 26 feet of the construction site.
- The loudest construction activities, such as concrete breaking and jack hammering, shall be limited to the middle of the day, when the sensitivity to such noises will be minimal.
- Pile driving activity shall be prohibited during nighttime hours.
- Residences located within 560 feet of pile driving activity shall be sent advanced notice of the construction schedule.
- Noise-producing signals, including horns, whistles, alarms, and bells, shall be used for safety warning purposes only.
- No project-related public address or music system shall be audible at adjacent receptors.
- Temporary noise barriers shall be utilized where practicable when Project activities and equipment are unavoidably close to noise-sensitive receptors.
- On-site trailers and containers shall be used as temporary barriers, as feasible.

- If complaints arise, the contractor will initiate a construction noise monitoring plan to ensure that the construction noise levels at the nearest noise-sensitive land uses are within the limits of the noise ordinance.

With implementation of the above BMPs, no adverse effects from construction noise and vibration would occur for Streetcar Alternatives 1 and 2.

Air Quality

Construction of the proposed project has the potential to create air quality impacts through the use of heavy-duty construction equipment and through vehicle trips generated by construction workers traveling to and from the project site. During construction, contractors shall be required to develop a Construction Waste Management and Disposal procedure to meet environmental regulations, permit conditions, or other regulatory requirements to reduce or eliminate the generation of waste, the loss of natural resources, and process emissions through source reduction, reuse, recycling, and reclamation. Fugitive dust emissions would primarily result from demolition and site preparation activities, although construction would comply with SCAQMD Rule 403 (Fugitive Dust). Nitrogen oxide emissions would primarily result from the use of diesel construction equipment. Construction emissions can vary substantially from day to day, depending on the level of activity, the specific type of operation and, for dust, the prevailing weather conditions.

Construction period is anticipated to be approximately 30 months, with major activities to be completed within the first 24-month period. Construction activity would temporarily generate regional criteria pollutant emissions, increase localized pollutant concentrations, and generate toxic air contaminant emissions and odors. If construction activities were to increase traffic congestion in the area, CO and other emissions from traffic would increase slightly while those vehicles are delayed. These emissions would be temporary and limited to the immediate area surrounding the construction site. Some phases of construction, particularly asphalt paving, would result in short-term odors in the immediate area of each paving sites. Such odors would be quickly dispersed below detectable thresholds as distance from the site increases. Construction emissions would be temporary and not adverse with implementation of mitigation to control equipment exhaust emissions. Therefore, Streetcar Alternatives 1 and 2 construction activities would not result in adverse effects related to air quality.

Energy Resources

Streetcar Alternative 1 or 2 construction activities that result in energy consumption include construction equipment, work trucks, haul trucks, and worker commute trips. It was assumed that all heavy construction equipment, such as loaders, cranes, scrapers, bulldozers, and heavy trucks, would use diesel fuel, whereas work trucks (pickups) and personal vehicles would use gasoline. Fuel consumption from construction activities was calculated based on the number and types of construction equipment, horsepower rating, hours of activity, and current fuel consumption rates. Equipment operating hours were estimated based on the preliminary construction staging concepts and anticipated equipment use. Consumption was calculated for each of the construction phases. It was assumed that each alternative would

require approximately the same amount of energy to construct as the alignment length varies by approximately 0.4 miles. As shown in **Table 3.16-4**, fuel consumption for either Streetcar Alternative 1 or 2 would be approximately 581,228 total gallons for the 30-month construction period.

TABLE 3.16-4: PROJECT FUEL CONSUMPTION BY CONSTRUCTION FOR STREETCAR ALTERNATIVES 1 AND 2			
Fuel Consumption by Phase	Hours	Fuel Consumed (Gallons)	Fuel Consumption Rate (Gallons Per Hour)
Advanced Utilities	1,720	119,230	69
Structures	3,870	154,671	40
Clearing and Grubbing	172	6,407	37
Grading	344	9,587	28
Foundations	430	7,976	19
Rail Delivery and Welding	645	4,461	7
Civil and Track Construction	5,160	136,374	26
Maintenance Facility Construction	3,440	50,540	15
Systems and Substations	3,784	59,648	16
Signals and Electrical	2,064	18,553	9
Striping	2,064	9,089	4
Signage	344	1,271	4
Finishing	688	3,421	5
TOTAL	24,725	581,228	

Source: URS Corp, 2011.

Construction of the proposed project would entail one-time energy expenditure through the manufacture of materials and from construction activities; however, it is anticipated that these expenditures would be offset by reductions in passenger vehicle fuel consumption after project implementation. Therefore, Streetcar Alternatives 1 and 2 construction activities would not result in adverse effects related to energy resources.

Water Quality, Hydrology, and Floodplains

Construction of Streetcar Alternative 1 or 2 would not involve major excavation; in most areas, ground disturbance would not be more than five feet beneath the existing surface. Near Raitt Street, ground disturbance may slightly exceed five feet to accommodate drainage improvements. Construction adverse effects would potentially include increased sediment and erosion in or near disturbed areas. For general construction activities, the proposed project is required to comply with NPDES General Construction Permit to discharge stormwater associated with construction activity (NPDES No. CAS000002). To address and reduce water quality adverse effects, the proposed project is required to prepare a Stormwater Pollution Prevention Program (SWPPP) in accordance with the General Construction Stormwater Permit. BMPs would be identified in the SWPPP to reduce or eliminate pollutants in stormwater discharges from the construction site. The SWPPP would

also implement BMPs to minimize or eliminate potential runoff which could infiltrate into waters of the U.S., particularly when the alignment crosses the Santa Ana River. These BMPs, listed in Section 3.18-3, would ensure compliance with Sections 401 and 404 of the CWA. A Standard Urban Stormwater Mitigation Plan (SUSMP) would also be prepared to address the quality and quantity of stormwater runoff generated on-site during project operation and the incorporation of permanent treatment BMPs into the project. Implementation of temporary and permanent treatment BMPs would minimize adverse effects to water quality due to the construction of the proposed project. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to water quality, hydrology, and geology.

There would be approximately 50 new catch basins constructed under the streetcar alternatives and one catch basin relocated under Streetcar Alternative 2. The proposed project would size or relocate drainage conveyance features appropriately so that flooding or ponding is not induced on the project site or on adjacent properties. With the implementation of a drainage control plan, no adverse effects to the local drainage basin would occur. Project construction would involve the construction of a single-track bridge within the 100-year floodplain. The bridge would be designed to minimize new impacts to flows within the channel. The additional piers to be installed as part of the bridge would not affect the 100-year floodplain. Construction practices will include minimizing temporary structures within the channel to minimize adverse effects during construction. Construction in floodplain areas will be restored to pre-project conditions. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to flooding and flood plains.

Safety and Security

During the construction of Streetcar Alternative 1 or 2 and the O & M Facility, concrete barriers with fencing would be placed around the perimeter of construction areas to restrict access and eliminate the threat to safety and security of anyone not directly involved in construction activity. Security lighting could be used during project construction, with lighting focused on potential access points to the construction areas to deter access. It is assumed that all additional related activity would be implemented in accordance with all federal and State requirements and permits during the construction process. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to pedestrian safety and security.

Construction activity would occur in front of Spurgeon Intermediate School, Romero Cruz Elementary School, George Washington Carver Elementary School, and James Garfield Elementary School. Construction zones near schools require additional considerations given to ensure the safety of students and staff and promote vehicle awareness. The City of Santa Ana would coordinate with the Santa Ana Unified School District and Santa Ana Police Department to develop and implement a construction traffic safety plan at schools adjacent to the alignment. Precautionary safety features would, as a minimum, include signs, barriers, and crossing and traffic signals to create a safe environment for parents and students during

pick-up/drop-off times, as well as the education plan to increase the construction and safety awareness for students and parents. Therefore, Streetcar Alternatives 1 and 2 would not result in adverse effects related to school safety.

Streetcar Alternatives 1 and 2 may affect emergency vehicle routes and service response times within the Study Area through temporary closure of public streets to accommodate construction equipment and activities. However, with implementation of the TMP described above, emergency vehicles would be aware of potential closures and could reroute in order to avoid delays in response times. Therefore, Streetcar Alternatives 1 and 2 construction activities would not result in adverse effects related to safety and security.

3.16.2.4 IOS-1 and IOS-2

It is anticipated that IOS-1 and IOS-2 would be constructed in 24 months, as compared to 30 months for Streetcar Alternatives 1 and 2. The approach to construction phasing for IOS-1 and IOS-2 would be similar to that of Streetcar Alternatives 1 and 2 in that the project would be constructed on a segment-by-segment basis along the proposed alignment. Construction effects associated with IOS-1 and IOS-2 would be similar to most of the effects discussed for Streetcar Alternatives 1 and 2. Two important differences are that the IOS Alternatives would not include construction activities associated with the Old Pacific Electric Santa Ana River Bridge and the Westminster Avenue bridge structure. Neither the IOS-1 nor IOS-2 Alternatives would change existing views associated with these elevated locations. The resulting historical and visual changes are evaluated in Sections 3.6 (Visual Quality) and 3.7 (Cultural Resources), respectively. Construction effects related to noise, vibration, and energy would be different under the IOS Alternatives, as described below.

Noise and Vibration. Construction affect associated with noise and vibration under IOS-1 and IOS-2 would differ from Streetcar Alternatives 1 and 2. In addition, there would be no construction noise impacts at sensitive receptors (i.e., R1 through R13) located between Harbor Boulevard and the O & M Facility Site B. Sensitive receptors (i.e., R14 through R70) would be affected by construction noise. Therefore, without mitigation, IOS-1 and IOS-2 would result in adverse effects related to construction noise.

With regards to construction vibration, IOS-1 and IOS-2 would utilize vibratory roller along the proposed alignment between Raitt Station and SARTC. Vibratory roller operation is anticipated to generate vibration that would be experienced by nearby sensitive receptors. Therefore, without mitigation, IOS-1 and IOS-2 would result in adverse effects related to vibration construction.

A key difference between the IOSs and the full Streetcar Alternatives is that bridge construction would not be required for the IOSs; thus, no pile drivers would be utilized. Therefore, IOS-1 and IOS-2 would not result in adverse effects related to construction vibration at the bridge location.

Energy. IOS-1 and IOS-2 construction activities that result in energy consumption include, construction equipment, work trucks, haul trucks, and worker commute trips. It was assumed that each alternative would require approximately the same amount of energy to

construct as the alignment length varies by approximately 0.4 miles. As shown in **Table 3.16-5**, IOS-1 or IOS-2 would consume approximately 400,584 gallons of fuel, which is approximately 31 percent less than the fuel consumption under Streetcar Alternatives 1 and 2. Construction of the IOS-1 and IOS-2 would entail one-time energy expenditure through the manufacture of materials and from construction activities. It is anticipated that these expenditures would be offset by reductions in passenger vehicle fuel consumption after project implementation. Therefore, IOS-1 and IOS-2 construction activities would not result in adverse effects related to energy.

TABLE 3.16-5: PROJECT FUEL CONSUMPTION BY CONSTRUCTION FOR IOS-1 AND IOS-2

Fuel Consumption by Phase	Hours	Fuel Consumed (Gallons)	Fuel Consumption Rate (Gallons Per Hour)
Advanced Utilities	1,720	119,230	69
Clearing and Grubbing	172	6,407	37
Grading	258	7,122	28
Foundations	430	7,976	19
Rail Delivery and Welding	430	2,978	7
Civil and Track Construction	3,440	128,281	37
Maintenance Facility Construction	3,440	50,540	15
Systems and Substations	2,838	45,715	16
Signals and Electrical	2,064	18,553	9
Striping	2,064	9,089	4
Signage	344	1,271	4
Finishing	688	3,421	5
Total	17,888	400,584	

Source: URS, 2011.

3.16.3 Measures to Minimize Harm

Land Use and Zoning

Construction impacts on land use would not be considered adverse. No mitigation measures are required.

Land Acquisition and Displacements

Construction impacts on land acquisition, displacement, and the local and regional economy would not be considered adverse. No mitigation measures are required.

Community Effects and Environmental Justice

Construction impacts on community effects and environmental justice would not be considered adverse. No mitigation measures are required.

Visual Quality

Construction impacts on visual quality would not be considered adverse. No mitigation measures are required.

Cultural Resources

Construction impacts on cultural resources would not be adverse with implementation of the following mitigation measure.

CR1 Treatment of Undiscovered Archaeological Resources – The contractor shall notify construction personnel of the potential for encountering significant archaeological and paleontological resources along the alignment, and instructed in the identification of fossils and other potential resources. All construction personnel shall be informed of the need to stop work on the project site until a qualified archaeologist or paleontologist has been provided the opportunity to assess the significance of the find and implement appropriate measures to protect or scientifically remove the find. If human remains are encountered during construction, all work shall cease in the area of potential affect and the Orange County Coroner’s Office shall be contacted pursuant to procedures set forth in Public Resources Code Section 5097 et seq. and Health and Safety Code in Sections 7050.5, 7051, and 7054 with respect to treatment and removal, Native American involvement, burial treatment, and re-burial, if necessary. A fifty-foot buffer, or more if deemed appropriate by the principal investigator, shall be established and work outside the buffer may resume.

Geology, Soils, and Seismicity

Construction impacts on geology, soils, and seismicity would not be considered adverse. No mitigation measures are required.

Hazardous Materials

Construction impacts on hazardous materials would not be considered adverse. No mitigation measures are required.

Traffic, Circulation, and Parking

As a Standard Condition of Approval required by the City of Santa Ana, Streetcar Alternatives 1 and 2 would implement a Traffic Management Plan (TMP) that reduces construction-related effects along the alignment, including within the City of Garden Grove, and at the chosen O & M Facility site. The TMP would:

- Identify potential types of traffic control that may have a real or perceived business impact such as short term lane closure, extended full street closures, detours, driveway impairment, or sidewalk closures;
- Consider sequenced construction to reduce localized effects to the greatest extent feasible;
- Minimize lane closures during AM and PM peak hours;
- Investigate the feasibility of performing construction activities in business areas during nighttime hours to minimize impacts during regular daytime business hours;
- Minimize sidewalk closures;
- Consider bicycle and pedestrian travel;

- Maintain access to businesses at all times except for minor temporary driveway closures;
- Designate parking areas for construction personnel;
- Designate haul routes for truck traffic;
- Minimize unnecessary heavy vehicle idling in construction zones;
- Plan temporary traffic detours to minimize traffic diversion into residential areas; and
- Identify methods to expedite construction in roadway intersections to reduce instances where multiple streets are impacted simultaneously.

Noise and Vibration

A Noise and Vibration Control Plan will be developed and implemented prior to construction that will include the following BMPs to minimize exposure to high levels of noise and vibration and ensure compliance with construction noise and vibration criteria listed in the FTA Transit Noise and Vibration Impact Assessment guidance document. This includes ensuring that vibration levels at historic structures do not exceed 0.12 inches per second peak particle velocity.

- Construction equipment shall have state-of-the-art and properly maintained muffler systems air-inlet silencers, where appropriate, as required by State and federal regulations. Mobile or fixed “package” equipment (e.g., arc welders, air compressors) will be equipped with shrouds and noise-control features that are readily available for that type of equipment.
- Noisy stationary construction equipment, such as compressors, shall be placed as far as practicable from residences.
- Grading and construction equipment shall be shut down when not in use for an extended period of time.
- Material stockpiles and mobile equipment staging, parking, and maintenance areas shall be located as far as practicable from noise-sensitive receptors.
- Where pile-driving operations are required, vibratory pile driving or pre-drilled pile insertion techniques shall be used whenever possible, rather than impact pile driving.
- The construction contractor shall manage construction phasing (scheduling demolition, earthmoving, and ground-impacting operations so as not to occur in the same time period), use low-impact construction technologies, and shall avoid the use of vibrating equipment where possible to avoid construction vibration impacts. Specifically, contractors shall use smaller and lower impact construction technologies where residential and historic structures are located within 26 feet of the construction site.
- The loudest construction activities, such as concrete breaking and jackhammering, shall be limited to the middle of the day, when the sensitivity to such noises will be minimal.
- Pile-driving activity shall be prohibited during nighttime hours.
- Residences located within 560 feet of pile-driving activity shall be sent advanced notice of the construction schedule.

- Noise-producing signals, including horns, whistles, alarms, and bells, shall be used for safety warning purposes only.
- No project-related public address or music system shall be audible at adjacent receptors.
- Temporary noise barriers shall be utilized where practicable when project activities and equipment are unavoidably close to noise-sensitive receptors.
- On-site trailers and containers shall be used as temporary barriers, as feasible.
- If complaints arise, the contractor will initiate a construction noise monitoring plan to ensure that the construction noise levels at the nearest noise-sensitive land uses are within the limits of the noise ordinance.

Air Quality

Construction impacts on air quality would not be considered adverse. No mitigation measures are required.

Energy Resources

Construction impacts on energy resources would not be adverse with implementation of the following mitigation measure:

- AQ1** During the construction phase, the contractor shall use Tier 4 or higher off-road construction equipment with higher air pollutant emissions standards.

Water Quality, Hydrology, and Floodplains

To address and reduce water quality effects, the proposed project would be required to prepare a Stormwater Pollution Prevention Program (SWPPP) in accordance with the General Construction Stormwater Permit. BMPs would be identified in the SWPPP to reduce or eliminate pollutants in stormwater discharges from the construction site. The SWPPP would also implement BMPs to minimize or eliminate potential runoff which could infiltrate into waters of the U.S., particularly when the alignment crosses the Santa Ana River. These BMPs would ensure compliance with Sections 401 and 404 of the CWA. A Standard Urban Stormwater Mitigation Plan (SUSMP) would also be prepared to address the quality and quantity of stormwater runoff generated on-site during project operation and the incorporation of permanent treatment BMPs into the project.

Safety and Security

Construction impacts on safety and security would not be considered adverse. No mitigation measures are required.

3.16.4 CEQA Determination

3.16.4.1 No Build Alternative

As described above, the No Build Alternative takes existing conditions within the Study Area and adds future planned and funded transit and roadway improvement projects. The streetcar would not operate under this alternative and there would not be project-related construction impacts. Therefore, the No Build Alternative would have no impacts related to construction.

3.16.4.2 TSM Alternative

Construction activity under the TSM Alternative would not require substantial land acquisition and displacement, affect visual environment, damage cultural or historical resources, disrupt community cohesion and character, or disproportionately affect minority and low-income populations. Construction activities would require construction vehicles and associated fuel consumption. Fuel consumption during the construction activity would lead to greater savings in fuel consumption for future operations. Therefore, the TSM Alternative would have no impacts related to construction.

3.16.4.3 Streetcar Alternatives 1 and 2

Aesthetics. As described above, project design features would ensure compatibility with visual environment. Construction activity would not block scenic views or increase nighttime light levels. Therefore, Streetcar Alternatives 1 and 2 construction activities would result in less-than-significant impacts related to aesthetics.

Air Quality. Construction emissions would temporarily affect air quality through the use of heavy-duty construction equipment and the type of construction activities that would occur under Streetcar Alternatives 1 and 2. Construction activities would be completed in a segment by segment basis to minimize the disruption to local residents and businesses within the Study Area. Short-term emissions generated from construction activity were estimated on a daily basis for each construction phase. Construction would have overlapping phases so maximum daily emissions for the overlapping construction phases were compiled for years 2012 through 2014. Determination of regional construction impacts are based on a comparison between construction emissions and the SCAQMD's regional construction emissions thresholds. **Table 3.16-6** presents the estimated daily emissions associated with each construction phase. Daily construction emissions for NOX would exceed the SCAQMD regional significance thresholds. Therefore, without mitigation, the Streetcar Alternatives 1 and 2 would result in significant impacts related to regional construction emissions. Implementation of Mitigation Measure AQ1 would reduce NOX emissions, but would still exceed the SCAQMD's significant thresholds.

Therefore, Streetcar Alternatives 1 and 2 construction activities would result in significant impact related to regional air quality.

Localized air pollutant emissions were evaluated relative to the exposure of local sensitive uses to air pollutant concentrations generated by the construction activity. Emissions for the localized construction air quality analysis of NO_x, CO, PM₁₀, and PM_{2.5} were compiled using LST methodology promulgated by the SCAQMD. The LSTs were developed for a project site of one acre and a 25 meter receptor distance. **Table 3.16-7** presents the estimated daily localized emissions associated with each construction phase.

TABLE 3.16-6: REGIONAL CONSTRUCTION EMISSIONS FOR STREETCAR ALTERNATIVES

Construction Phase	Pounds Per Day					
	VOC	NO _x	CO	SO _x	PM _{2.5}	PM ₁₀
Advance Utility Work	11	92	44	<1	4	4
Structures	7	63	24	<1	2	2
Clearing and Grubbing	5	42	21	<1	2	2
Grading	3	29	14	<1	1	1
Foundations	2	20	13	<1	1	1
Rail Delivery and Welding	2	8	8	<1	1	1
Civil and Track Instructions	5	38	21	<1	2	2
O & M Facility Construction	1	12	5	<1	2	2
System and Substations	2	18	11	<1	1	1
Signals and Electrical	1	9	7	<1	1	1
Striping	1	5	3	<1	<1	<1
Signage	1	4	3	<1	<1	<1
Finishing	<1	2	3	<1	<1	<1
Maximum Year 2012 /a/	27	227	103	<1	10	10
Maximum Year 2013 /a/	16	136	69	<1	6	6
Maximum Year 2014 /a/	10	78	51	<1	4	4
REGIONAL SIGNIFICANCE THRESHOLD	75	100	550	150	55	150
Exceed Threshold?	No	Yes	No	No	No	No

/a/ Maximum emissions for years 2012 through 2014 were based on combined emissions from overlapping construction phases.

Source: URBEMIS2011, Version 9.2.4, Conducted by URS Corp., August 2011.

TABLE 3.16-7: LOCALIZED CONSTRUCTION EMISSIONS FOR STREETCAR ALTERNATIVES

Construction Phase	Pounds Per Day			
	NO _x	CO	PM _{2.5}	PM ₁₀
Advance Utility Work	92	44	4	4
Clearing and Grubbing	42	21	2	2
Grading	29	14	1	1
Foundations	20	13	1	1
Rail Delivery and Welding	8	8	1	1
Civil and Track Instructions	40	22	2	2
O & M Facility Construction	12	5	2	9
System and Substations	18	11	1	1
Signals and Electrical	9	7	1	1
Striping	5	3	<1	<1
Signage	4	3	<1	<1
Finishing	2	3	<1	<1
LOCALIZED SIGNIFICANCE THRESHOLD /a/	119	751	4	7
Exceed Threshold?	No	No	No	Yes

/a/ Assumes a 1-acre project site and a 25-meter (85-foot) receptor distance.

Source: URBEMIS2011, Version 9.2.4, Conducted by URS Corp., August 2011.

Daily localized construction emissions would exceed the SCAQMD localized threshold for PM₁₀. Therefore, without mitigation, the Streetcar Alternatives 1 and 2 construction activities would result in significant impacts related to localized construction emissions.

The following mitigation measure would reduce emissions of NO_x during construction activity. However, NO_x emissions would still exceed the SCAQMD's significance thresholds after implementation of Mitigation Measure **AQ1**.

AQ1 During the construction phase, the contractor shall use Tier 4 or higher off-road construction equipment with higher air pollutant emissions standards.

Localized construction emissions were determined to result in a significant impact. The proposed project is subjected to SCAQMD Rule 403 (Fugitive Dust), which requires that dust control measures (i.e., watering, offsite dirt trackout, and haul truck freeboard clearance) be applied to minimize the generation of fugitive dust during construction activities. Despite the application of these dust control measures, PM₁₀ emissions is still anticipated to exceed the SCAQMD's localized significance thresholds. No other feasible mitigation measures, standard conditions, or BMPs exist that would reduce this impact. Therefore, the Streetcar Alternatives 1 and 2 would result in a significant and unavoidable impact related to localized air quality emissions.

Biological Resources. The Study Area is characterized as a densely-developed urban setting and contains no natural biological communities. Literature review and field survey data determined that no special status plant or wildlife species have the potential to occur within the Study Area. Construction activity is not anticipated to substantially affect common or special status species, their habitats, or special aquatic resource areas. Therefore, Streetcar Alternatives 1 and 2 construction activities would result in less-than-significant impacts related to special status species.

However, construction activity would potentially result in minor habit loss and temporary displacement for nesting birds within trees and shrubs throughout the Study Area. Bird populations and other migratory species are likely to retreat from the Study Area until construction is complete. Prior to construction activity, a qualified biologist would conduct a pre-construction nesting-bird survey. If active nests are observed, a minimum buffer zone from occupied nests would be recommended to the maximum extent practicable. In addition, prior to "removing, cutting, pruning, breaking, injuring, defacing, or in any other way interfering with any tree or shrub, or any part thereof, either above or below the ground, growing on any public thoroughfare, park, or public place," the construction contractor would be required to obtain permission of the director of recreation and parks or the authorized agents within the City of Garden Grove. Therefore, Streetcar Alternatives 1 and 2 construction activities would result in a less-than-significant impact related to nesting birds and migratory species.

Cultural Resources. As described above, construction activities would not adversely alter, remove, or destroy known or previously unidentified archaeological, paleontological, or historical resources. Therefore, Streetcar Alternatives 1 and 2 construction activities would not result in significant impacts related to cultural resources.

Geology and Soils. As described above, construction activities could temporary increased soil erosion and soil instability. The design of either Streetcar Alternative 1 or 2 would establish and implement BMPs to prevent substantial on-site erosion, and minimize soil erosion and topsoil loss. Therefore, Streetcar Alternatives 1 and 2 construction activities would result in less-than-significant impacts related to geology and soils.

Greenhouse Gas Emissions. During construction activities, emissions from heavy equipment exhaust, delivery trucks, and fugitive dust would be generated. Although the construction phase is temporary, GHGs are assumed to contribute to climate change for the lifetime of the project, which is assumed to be 30 years, as per SCAQMD methodology. **Table 3.16-8** presents the estimated GHG emissions for each construction phases. The total GHG emissions, which include both operational and construction emissions is presented in Table 3.12-6, shown above.

TABLE 3.16-8: GHG CONSTRUCTION EMISSIONS FOR STREETCAR ALTERNATIVES	
Construction Phase	Greenhouse Gases (Tons Per Year)
Advance Utility Work	4
Structures	2
Clearing and Grubbing	2
Grading	1
Foundations	1
Rail Delivery and Welding	1
Civil and Track Instructions	2
O & M Facility Construction	1
System and Substations	1
Signals and Electrical	1
Striping	<1
Signage	<1
Finishing	<1
Maximum Year 2012 /a/	10
Maximum Year 2013 /a/	6
Maximum Year 2014 /a/	4
Total GHG Emissions	20

/a/ Maximum emissions for years 2012 through 2014 were based on combined emissions from overlapping construction phases.

Source: URBEMIS2011, Version 9.2.4, Conducted by URS Corp., August 2011.

As discussed in Section 3.12, GHG emissions associated with Streetcar Alternatives 1 and 2 would be approximately 1,224 and 1,144 metric tons of CO₂e per year, respectively, and would not exceed the SCAQMD’s GHG significance threshold of 10,000 metric tons of CO₂e per year. Therefore, Streetcar Alternatives 1 and 2 construction activities would result in less-than-significant impacts related to GHG emissions.

Hazards and Hazardous Materials. As discussed above, construction activities are unlikely to encounter contaminated soil or groundwater, or create accident conditions involving the release of hazardous materials or waste. Consequently, construction activity would not affect the exposure, use, transport or storage of hazardous materials. In addition, Streetcar

Alternatives 1 and 2 would comply with regulatory requirements to control exposure to asbestos and lead based paints, along with exposure and disposal of contaminated soil or groundwater at construction sites. Therefore, Streetcar Alternatives 1 and 2 construction activities would result in less-than-significant impacts related to hazards and hazardous materials.

Hydrology and Water Quality. As discussed above, construction activities would entail soil disturbance activities such as grading and excavation that may create potential impact for sediment to be transported with stormwater runoff. Compliance with the National Pollutant Discharge Elimination System General Construction Permit and implementation of BMPs would minimize water quality impacts during construction and dewatering activities. Therefore, Streetcar Alternatives 1 and 2 construction activities would result in less-than-significant impacts related to hydrology and water quality.

Land Use and Planning. As discussed above, construction activities may require temporary access restrictions to land uses along Santa Ana Boulevard and Fourth Street, but would not affect zoning or surrounding land use compatibility. Construction impacts are not expected to last longer than three to four months in one place to minimize the disruption to local residents and businesses within the Study Area. Therefore, Streetcar Alternatives 1 and 2 construction activities would result in less-than-significant impacts related to land use and planning.

Mineral Resources. Construction activity would not affect mineral resources. According to the City of Santa Ana General Plan, Land Use Element, and the California Geological Survey, there are no known mineral resources within the Study Area. Therefore, Streetcar Alternatives 1 and 2 construction activities would result in no impacts related to mineral resources.

Noise and Vibration. As discussed above, alignment and bridge construction activities could employ pieces of equipment (i.e., mounted impact hammer, foundation driller, pneumatic tools, concrete pump truck, and pavement miller or scarifier) that would exhibit high noise levels. Daytime and nighttime construction activities were determined to affect nearby residential land uses. With the implementation of the Noise and Vibration Control Plan described in Section 3.16.2.3, above, Streetcar Alternatives 1 and 2 would result in less-than impacts related to construction noise.

As discussed above, vibration from construction activities depends on construction equipment and the type of soil in the vicinity of the construction site. During alignment construction, it is anticipated that a vibratory roller would generate the highest vibration levels. As stated in Section 3.16.2.3, above, nearly all the sensitive receptors near the streetcar alignments within the Study Area – R1 through R70 – would be impacted by construction activities. During bridge construction, it is anticipated that pile driving would generate the highest vibration levels. As stated in Section 3.16.2.3, above, R1 and R7 would be impacted by construction activities. With the implementation of the Noise and Vibration Control Plan described in Section 3.16.2.3, above, Streetcar Alternatives 1 and 2 would result in less-than impacts related to construction vibration.

Population and Housing. As discussed above, Streetcar Alternatives 1 and 2 construction activities would not require additional land acquisition or displacement beyond those properties identified for project implementation. Therefore, Streetcar Alternatives 1 and 2 construction activities would result in no impacts related to population and housing.

Public Services. Construction activity would not affect public service facilities (i.e., fire protection, police protection, schools, parks, and public recreation facilities). Streetcar Alternatives 1 and 2 may affect emergency vehicle routes and service response times within the Study Area through temporary closure of public streets to accommodate construction equipment and activities. However, with implementation of the TMP described above, emergency vehicles would be aware of potential closures and could reroute in order to avoid delays in response times. Therefore, Streetcar Alternatives 1 and 2 construction activities would result in less-than-significant impacts related to public services.

Recreation. Streetcar Alternatives 1 and 2 would improve transit access to recreational facilities within the Study Area. Construction activity would not affect recreation. Streetcar Alternatives 1 and 2 does not involve or require the construction of new or expanded recreational facilities. Therefore, Streetcar Alternatives 1 and 2 construction activities would result in no impacts related to recreation.

Transportation/Traffic. As discussed above, construction impacts would be localized for the duration of the construction. The duration of the localized impacts would likely be no more than approximately six months in one location and widespread disruption to traffic circulation in the streetcar construction area are not anticipated. Construction would also require sidewalk and roadway lane closures but would be limited to the areas immediately surrounding the proposed construction site. Duration of roadway disruption due to installation of rails in the road bed would interfere with activity on the roadway network, driveway access, and parking availability (e.g., 4th Street). As discussed above, implementation of a TMP would eliminate potential impacts. Therefore, Streetcar Alternatives 1 and 2 construction activities would result in no impacts related to transportation and traffic.

Utilities and Service Systems. Construction activity would not affect utilities and service systems. Therefore, the Streetcar Alternatives 1 and 2 construction activities would have no impacts related to utilities and service systems.

3.16.4.4 IOS-1 and IOS-2

As discussed in Section 3.16.2.4, the construction period for IOS-1 and IOS-2 (24 months) is less than the construction period for Streetcar Alternatives 1 and 2 (30 months). Two important distinctions are that the IOS-1 and IOS-2 would not include construction activities associated with the Old Pacific Electric Santa Ana River Bridge and the Westminster Avenue bridge structure, and therefore, sensitive receptors located near the bridge would not be affected under IOS Alternatives.

Construction effects associated with IOS-1 and IOS-2 would be similar to most of the effects for Streetcar Alternatives 1 and 2, but not all. As discussed in Section 3.16.2.4, above, construction effects associated with noise and vibration under IOS-1 and IOS-2 would differ

from Streetcar Alternatives 1 and 2. Construction noise impacts would not occur at sensitive receptors R1 through R13, but impacts would still occur at sensitive receptors R14 through R70. With regards to construction vibration, IOS-1 and IOS-2 would employ vibratory roller between Raitt Station and SARTC. Vibratory roller operation is anticipated to generate vibration that would be experienced by nearby sensitive receptors. However with implementation of the Noise and Vibration Control Plan, IOS-1 and IOS-2 construction activities would result in less-than-significant impacts related to construction noise and vibration.

3.16.4.5 Significance After Mitigation

Other than air quality, impacts related to construction were determined to be less than significant. Even with implementation of Mitigation Measure **AQ1**, a significant impact from construction air quality would remain.

3.17 Other Considerations

This section provides information and discussion on the following topics, consistent with CEQA Guidelines Section 15126, which were not otherwise discussed and analyzed under Chapter 3.0 of this document:

- Biological Resources
- Utilities and Service Systems
- Summary of Significant Unavoidable Impacts
- Significant Irreversible Environmental Changes
- Growth Inducing Impacts

3.17.1 Biological Resources

In accordance with Appendix G of the State CEQA Guidelines, the proposed project would have a significant impact related to biological resources if it would:

- 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 (CDFG) or U.S. Fish and Wildlife Services (USFWS);
- 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 CDFG or USFWS;
- 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;
- 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;

- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; and/or
- 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 Build Alternative

The Study Area is heavily urbanized and developed. There are no ecologically sensitive areas or wildlife preserves within the Study Area. The No Build Alternative includes conditions within the Study Area combined with future planned and funded transit and roadway improvement projects (the streetcar would not operate under the No Build Alternative). Each of these future projects will be environmentally cleared through separate project-specific environmental documentation. While unlikely, impacts to biological resources would be mitigated. Therefore, the No Build Alternative would result in no impacts related to biological resources.

TSM Alternative

The TSM Alternative emphasize low-cost improvements and operational efficiencies, such as focused traffic engineering actions, expanded bus service, and improved access to transit services. The TSM Alternative would involve small physical improvements and operational improvements, such as focused traffic engineering actions, expanded bus service, and improved access to transit services within the Study Area. The TSM Alternative also would include modifications and enhancements to selected bus routes in the Study Area, intersection/signal improvements, and bus stop amenity upgrades. These improvements would not affect biological resources. Therefore, the TSM Alternative would have no impacts related to biological resources.

Streetcar Alternatives 1 and 2

Candidate, Sensitive, or Special Status Species and Sensitive Natural Communities. The Study Area is heavily developed and contains no natural biological communities. The ground disturbance footprint consists entirely of disturbed or developed land, which includes roadways, developed and undeveloped lots, parking areas, and residential and commercial developments. Literature review and field survey data determined that no special status plant or wildlife species have the potential to occur within the project's footprint and that the Study Area lacks suitable habitat that would typically support special status species or receive State or federal Endangered Species Act protections. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to candidate, sensitive, or special species.

Wetlands and Riparian Habitat. The Santa Ana River is the only potential special aquatic feature within the Study Area. It is concrete lined and contains no wetlands or hydrophytic vegetation. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to wetlands and riparian habitat.

Wildlife Movement. The Study Area is already heavily developed and additional development would not interfere with wildlife movement. The Study Area does not provide a major or local wildlife corridor or travel route because it does not connect two significant habitats for either fish or wildlife species. Operational activity within the ROW may frighten urban wildlife, such as raccoons and opossums. However, operational noise would cause most animals to avoid streetcar activity. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to wildlife movement.

Biological Resources (e.g., Tree Preservation Policy). The alignments associated with Streetcar Alternatives 1 and 2 would be located within existing surface streets or within the PE ROW. Operational activities would not result in the removal of special species trees listed in the Tree Preservation Policy. Therefore, Streetcar Alternatives 1 and 2 would not conflict with local policies or ordinances protecting biological resources, such as the tree preservation policy. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to biological resources.

Conservation Plans. The City of Santa Ana recognizes that it is located in an urban setting, and has tailored the goals of its Conservation Element accordingly. To obtain its goals, the City has established objectives that focus on the preservation of open space. Implementation of Streetcar Alternatives 1 and 2 would not conflict with local policies or ordinances protecting open space. The City's Conservation Element encourages establishment of mixed-use areas and the overall visual enhancement of the City, both of which will occur within the Study Area. In addition, the Study Area is not located within a Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local (including the City of Garden Grove), regional, or State habitat conservation plan. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to conservation plans.

IOS-1 and IOS-2

The assessment of biological resources for IOS-1 and IOS-2 is similar to the assessment completed for Streetcar Alternatives 1 and 2 with the exception that the alignment would not cross the concrete-lined Santa Ana River. Therefore, IOS-1 and IOS-2 would result in less-than-significant impacts related to biological resources.

Significance After Mitigation

Impacts related to biological resources were determined to be less than significant. No mitigation measures are required.

3.17.2 Utilities and Service Systems

In accordance with Appendix G of the State CEQA Guidelines, the proposed project would have a significant impact related to utilities and service systems if it would:

- Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board;

- 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;
- Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects;
- Have sufficient water supplies available to serve the project from existing entitlements and resources or are new or expanded entitlements needed;
- Result in the 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;
- Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs; and/or
- Comply with federal, State and local statutes and regulations related to solid waste.

No Build Alternative

The No Build Alternative includes conditions within the Study Area combined with future planned and funded transit and roadway improvement projects. Each of these future projects will be environmentally cleared through separate project-specific environmental documentation. It is anticipated that impacts to utilities and services would be mitigated as part of this process. Therefore, the No Build Alternative would result in no impacts related to utilities and service systems.

TSM Alternative

The TSM Alternative emphasize low-cost improvements and operational efficiencies, such as focused traffic engineering actions, expanded bus service, and improved access to transit services. The TSM Alternative would involve small physical improvements and operational improvements, such as focused traffic engineering actions, expanded bus service, and improved access to transit services within the Study Area. The TSM Alternative also would include modifications and enhancements to selected bus routes in the Study Area, intersection/signal improvements, and bus stop amenity upgrades. These minor improvements would have no or negligible impacts to utilities and service systems. Therefore, the TSM Alternative would result in no impacts related to utilities and service systems.

Streetcar Alternatives 1 and 2

Wastewater Treatment and Facilities. Streetcar Alternatives 1 and 2 would not generate wastewater from activity along the alignment or at stations. Wastewater would be generated by the O & M Facility would not put added strain on existing wastewater treatment capacity. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to wastewater treatment and facilities.

Stormwater Drainage Facilities. With the exception of one location along the PE ROW where the alignment crosses the Santa Ana River, the existing drainage pattern of the alignments for both Streetcar Alternatives 1 and 2 would not be substantially altered or impacted by the proposed project. Streetcar tracks would be constructed mostly at-grade with the existing

street ROW and the PE ROW. The streetcar tracks do not have gutters like a traditional road, but water that falls onto impervious surfaces associated with the track system would be collected and conveyed into the storm drain system by inlets similar to roadway inlets. Stormwater from non-street portions of the alignment may be directed to vegetated swales for treatment before conveyance to the City storm drain. As described in Section 3.14 (Water Quality, Hydrology, and Floodplains) above, this BMP and others designed to reduce potential surface water pollution would eliminate potential impacts. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to stormwater drainage facilities.

Water Supply. The proposed project is a transportation facility and would not deplete groundwater supplies. Potential O & M Facility Sites A and B would use water for maintenance activities (e.g., vehicle washing) and worker hygiene. Implementation of BMPs would ensure that water use would be minimal. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to groundwater.

Solid Waste Disposal and Compliance with Regulations. Streetcar Alternatives 1 and 2 would not generate solid waste from activity along the alignment, although standard waste receptacles would be placed at stations. Solid waste would be generated at the O & M Facility. Trash receptacles would remain closed at all times except when being emptied by maintenance staff, be emptied weekly by City of Santa Ana maintenance personnel or more frequently if necessary, and would be covered or sheltered by a roof or overhang whenever possible. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to solid waste disposal and regulations.

IOS-1 and IOS-2

The assessment of utilities and service systems for IOS-1 and IOS-2 is similar to the assessment completed for Streetcar Alternatives 1 and 2. Therefore, IOS-1 and IOS-2 would result in less-than-significant impacts related to utilities and service systems.

Significance After Mitigation

Impacts related to utilities and service systems were determined to be less than significant. No mitigation measures are required.

3.17.3 Parklands and Recreational Facilities

In accordance with Appendix G of the State CEQA Guidelines, the proposed project would have a significant impact related to recreation if it would:

- 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; and/or
- Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.

No Build Alternative

The No Build Alternative includes conditions within the Study Area combined with future planned and funded transit and roadway improvement projects. Each of these future projects

will be environmentally cleared through separate project-specific environmental documentation. The streetcar would not operate under the No Build Alternative, and consequently, there would not be related effects on recreational facilities. Therefore, the No Build Alternative would have no impacts related to recreational facilities.

TSM Alternative

The TSM Alternative emphasizes low-cost improvements and operational efficiencies, such as focused traffic engineering actions, expanded bus service, and improved access to transit services. It may include some minor physical enhancements, such as improvements to transit stop amenities (e.g., bus benches). These minor improvements would have negligible impacts to recreational facilities. Therefore, the TSM Alternative would result in less-than-significant impacts related to recreational facilities.

Streetcar Alternatives 1 and 2

The City of Santa Ana has approximately 400 acres of public parks and recreational facilities distributed uniformly throughout the City. According to the City of Santa Ana General Plan Open Space, Parks, and Recreation Element, approximately two acres of open space exist for every 1,000 residents. The following parks and recreational areas are located within 0.25 miles of the proposed project alignment:

- Logan Park – includes basketball courts and a playground
- French Park – includes a picnic area
- Sasser Park – includes a water fountain
- Birch Park – includes a picnic area
- Angels Community Park – includes baseball diamonds, basketball courts, playground, and a picnic area
- Flower Street Park – includes an athletic field
- El Salvador Park – includes baseball diamonds, basketball courts, playground, picnic area, handball, and a recreation center
- Spurgeon Intermediate School Joint Use Recreational Area – includes a track, picnic area and baseball diamond
- Campesino Park – includes basketball courts, playground, picnic area, and a handball court
- Willowick Public Golf Course
- Santa Ana Senior Center

The City of Santa Ana General Plan Open Space, Parks, and Recreation Element has identified the need to initiate a program of joint school-community use of school recreational facilities to expand usable public spaces, and also identifies local schools in its Open Space Plan. There are four schools designated for joint use, three of which are not located within the Study Area. Spurgeon Intermediate School has a recreational area with access to the public for joint use.

The Santa Ana River Trail is owned and maintained by the County of Orange Public Facilities and Resources Department. The trail is an existing Class I trail along the Santa Ana River and is fully grade-separated from cross traffic for its entire length within Orange County. The trail

crosses where the PE ROW and the bicycle and pedestrian/equestrian uses are separated from each other. Within the Study Area, there is an existing Class I bike trail on the east side of the river, and the pedestrian/equestrian trail is on the west side of the river.

The City of Santa Ana General Plan Circulation Element designates the PE ROW as open space and proposes a Class I Bike Path from Westminster Avenue to Raitt Street as a part of its Bikeway Master Plan. Although the City of Santa Ana proposes the bike trail, OCTA owns the former PE ROW. Most of the former railroad right-of-way is currently vacant, and public access is prohibited at this time.

The City of Santa Ana has identified proposed Class II bike lanes along Santa Ana Boulevard and Civic Center Drive, between Grand Avenue and Fairview and Raitt Streets, respectively. On-street bicycle lanes are planned only for locations on major arterials where they can be safely accommodated. These bicycle lanes would vary in width from four to seven feet depending on the available right-of-way.

Streetcar Alternatives 1 and 2 would improve transit access to recreational facilities within the Study Area; several of which are located within walking distance of stations. These alternatives would promote inter-city travel and increase access to the Study Area. This would potentially increase the use of existing parks and recreational facilities. However, based on ridership projections, the increased use is not expected to be significant enough to result in substantial physical deterioration of existing recreation facilities, including the Santa Ana River Trail and bikeways.

The Santa Ana River Trail (bicycle and equestrian paths) currently crosses underneath the Santa Ana River Bridge. Streetcar Alternatives 1 and 2 would be designed to provide sufficient clearance for users of these paths on both sides of the Santa Ana River. Operations of Streetcar Alternatives 1 and 2 would not interfere with activity or access to the trail. The new streetcar bridge would not include pedestrian or bicycle paths, and no connection has been provided from the bridge to the Santa Ana River Trail. Potential impacts to the paths during construction are discussed in Section 3.16. Therefore, the operation of Streetcar Alternatives 1 and 2 would not result in a significant impact to the Santa Ana River Trail.

Streetcar Alternatives 1 and 2 would not result in substantial physical deterioration or adverse physical effects to a recreational facility. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to recreational facilities.

IOS-1 and IOS-2

Impacts to parks and recreational facilities from the implementation of IOS-1 and IOS-2 would be similar to those identified for Streetcar Alternatives 1 and 2, with the exception of those impacts within the PE ROW segment. The following are recreational resources located within the PE ROW segment that would not be included in IOS-1 and IOS-2:

- Spurgeon Intermediate School
- Cesar Chavez Campesino Park
- El Salvador Park

- Willowick Public Golf Course
- Santa Ana River Trail
- PE ROW Trail

The recreational resources listed above would not be affected from implementation of IOS-1 and IOS-2. The remaining impacts identified in Streetcar Alternatives 1 and 2 would remain the same. Therefore, IOS-1 and IOS-2 would result in less-than-significant impacts related to recreational facilities.

Significance After Mitigation

Impacts related to recreational facilities were determined to be less than significant. No mitigation measures are required.

3.17.4 Growth Inducing Impacts

In accordance with Appendix G of the State CEQA Guidelines, the proposed project would have a significant impact related to growth inducing impacts if it would:

- Induce substantial population growth in an area, either directly or indirectly

Although Streetcar Alternatives 1 and 2 would provide improved mobility and access to the Study Area in accordance with adopted transportation and land use plans, these improvements would not result in substantial population growth. The Study Area experienced a population decline between 2000 and 2010, while vacancy rates increased. Streetcar Alternatives 1 and 2 would provide construction jobs in the Study Area, which could result in a population increase in Santa Ana, Garden Grove, or Orange County. However, population growth would be minor and would not exceed the growth projections or available housing supply in the Study Area. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant impacts related to population growth.

In addition, Section 15126.2(d) of the CEQA Guidelines states that the assessment of growth-inducing impacts in the EIR must describe the “ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment.”

Growth-inducing projects are generally located in isolated, undeveloped, or underdeveloped areas, necessitating the extension of major infrastructure (e.g., sewer and water facilities, roadways, etc.) or are those that could encourage “premature” or unplanned growth (i.e., “leapfrog” development, or urban sprawl). Although development of the proposed project supports urban growth, it would not remove an obstacle to population growth since the Study Area is heavily urbanized.

Moreover, the proposed project is consistent with the transportation and air quality goals of the City of Santa Ana’s Transit Vision, is listed as a TCM within the AQMP, is in conformity with the SIP, and is consistent with the goals of the Climate Change Scoping Plan, the development of the proposed project would be consistent with local and regional management plans. The proposed project would not spur new direct or indirect regional growth in terms of

population or employment, and, therefore, would not result in significant growth-inducing impacts.

3.17.5 Significant Irreversible Environmental Changes

Section 15126.2(c) of the CEQA Guidelines requires a discussion of significant irreversible environmental changes which would be caused by the proposed project should it be implemented. Specifically, the CEQA Guidelines state that:

“Use of nonrenewable resources during the initial and continued phases of the project may be irreversible since a large commitment of such resources makes removal or nonuse thereafter unlikely primary impacts and particularly secondary impacts generally commit future generations to similar uses. Also irreversible damage can result from environmental accidents associated with project construction and operation.”

The construction and implementation of the proposed project would entail the irreversible and irretrievable commitment of energy and human resources; however, this commitment of energy, personnel, and building materials would be commensurate with that of other projects of similar magnitude. Labor would also be committed for the planning, design, construction, and operation phases of the proposed project.

Construction would require the commitment of a variety of nonrenewable or slowly renewable natural resources. Energy (in the form of fossil fuels) and construction materials (such as lumber, sand and gravel, metals, and water) would be irretrievably committed for construction of the proposed project. However, there would be some offset of the loss of energy resources. Demolition debris would be recycled for other uses. For example, inert construction debris (e.g., concrete and asphalt) would potentially be crushed and used for road base or other uses requiring aggregate as reinforcement material.

Ongoing operation and maintenance of the proposed project would entail a further commitment of energy resources in the form of petroleum products (diesel fuel and gasoline), natural gas, and electricity. This commitment of energy resources would be a long-term obligation because, it is not possible to return the land to its original condition once it has been developed. However, as established in Section 3.13 of this document, the impacts of increased energy usage are not considered adverse environmental impacts.

Furthermore, the proposed transit improvement project would offer many environmental benefits. In summary, implementation of the proposed project would involve the following irreversible environmental changes to existing natural resources, but the impact would be less than significant:

- Commitment of natural resources during project construction, including the consumption of fossil fuels and the use of materials in construction (such as steel, concrete, asphalt, and plastics); and
- Commitment of energy and water resources as a result of the operation and maintenance of the proposed project.

3.17.6 Summary of Significant and Unavoidable Impacts

Section 15126.2(b) of the CEQA Guidelines requires that an EIR describe significant environmental impacts that cannot be avoided, including those effects that can be mitigated but not reduced to a less-than-significant level. Impacts associated with the proposed project were concluded to be significant and unavoidable for one environmental topic area, air quality.

Air Quality - Construction. Construction emissions will temporarily impact air quality with the amount and type of construction activities that will occur for the proposed project. The proposed project will be segmented for construction purposes and construction activities will be completed in phases to minimize the disruption to local residents and businesses in the Study Area. Construction of the proposed project is anticipated to be divided in four to five short segments with a total construction time of 30 months.

Mitigation measures will assist in mitigating these short-term impacts; however, even with the implementation of mitigation measures, construction emissions would still exceed the SCAQMD significance threshold for nitrogen oxides. Therefore, the proposed project's contribution to cumulative air quality impacts would be significant, and the project's incremental contribution is cumulatively considerable.

Construction-related emissions were calculated on a daily basis for each construction phase and evaluated against the SCAQMD's regional construction emissions thresholds. A summary of the estimated peak construction emissions compared to the applicable thresholds of significance within the SCAQMD is presented in Table 3.2-7 of Section 3.2 of this document. Some of the construction phases overlap so maximum emissions for the overlapping construction phases were compiled for years 2012 through 2014 and compared against the SCAQMD significance thresholds. Emissions associated with the proposed project would result in exceedances of the SCAQMD's NO_x threshold for construction activities for the years 2012 and 2013. Consequently, construction of Streetcar Alternatives 1 and 2 would result in a significant regional air quality impact. Construction emissions of PM₁₀ were found to exceed the SCAQMD's Localized Significance Thresholds and would therefore result in a local air quality impact to sensitive receptors in the vicinity of the O & M Facility.

As discussed in Section 3.16 (Air Quality) of this document, implementation of Mitigation Measure **AQ1** would reduce emissions of NO_x during construction. However construction-related emissions would still exceed the SCAQMD's significance thresholds and would result in a significant and unavoidable significant impact to air quality.

3.18 Cumulative Impacts

Project cumulative impacts are evaluated by first identifying the conditions that would exist in 2035 as a result of the project, along with all other past, present and reasonably foreseeable future projects that are in the vicinity. A cumulatively significant condition in 2035 is identified through a comparison of the conditions created by the No Build Alternative (which does not include the project) to the conditions created by the Streetcar Alternatives 1 and 2. In general, the cumulative analysis is similar for NEPA and CEQA; however, CEQA emphasizes analysis of the project's contribution to a cumulatively adverse condition.

This section describes the direct and indirect long-term cumulative impacts of the project by comparing the No Build and Streetcar Alternatives 1 and 2 that were discussed in Sections 3.1 through 3.16.

Table 3.18-1 lists current planned and pending projects in the City of Santa Ana and surrounding communities that are reasonably foreseeable. **Figure 3.18-1** shows the location of these projects. The related projects are considered in as part of the baseline for the No Build Alternative in the cumulative analysis.

3.18.1 Aesthetics

The related projects listed in Table 3.18-1 are not anticipated to result in cumulative changes to the visual character and quality of the Study Area. The various local approvals for those projects would ensure visual compatibility with the existing environment. As discussed in Section 3.6.2 Visual Quality, the proposed project would not degrade the existing visual character and quality of the Study Area, including lighting and glare. The combined effect of the alternatives with the No Build Alternative would not result in a cumulative impact. Therefore, the alternatives would result in less-than-significant cumulative impacts related to light and glare.

TABLE 3.18-1: CUMULATIVE PROJECT LIST

No.	Project	Description/Land Use	# Residential Units or Total Building Area	Location	Primary APN	Environmental Resource Area Potentially Impacted /a/
APPROVED						
1	Alliance Church of Orange	Church addition (gym/classroom), <i>approved 2009</i>	21,000 sq. ft.	2130 N. Grand Ave.	396-191-44	AQ
2	Christ Our Savior Cathedral	Sanctuary (2,800-seat), <i>approved 2005</i>		2001 W. McArthur Blvd.	140-061-94	AQ
3	Discovery Science Center Ph. II	IMAX theatre (275-seat), <i>approved 2002</i>		2032 N. Main St.	399-102-09	AQ
4	Lyon Homes	Residential (Condo), <i>approved 2011</i>	300 units	100-130 E. McArthur Blvd.	411-081-26	AQ
5	Promenade Point	Residential (Condo), <i>approved 2005</i>	194 units	200 E. First American Wy.	411-074-03	AQ
6	CVS/Sav-On Drug Store	Pharmacy, drive through, <i>approved 2008</i>	15,836 sq. ft.	115 N. Harbor Blvd.	198-182-22	AQ
7	Skyline Phase II	Residential (Condo), <i>approved 2005</i>	150 units	10 E. Hutton Ctr.	411-081-28	AQ
8	Vista Del Rio	Residential, <i>approved 2009</i>	41 units	1600 W. Memory Ln.	101-055-27	AQ
9	Xerox Tower II	Office, <i>approved 2001</i>	210,000 sq. ft.	200 N. Cabrillo Park Dr.	400-071-03	AQ, TR
10	YMCA	Recreational Facility, <i>approved 2007</i>	32,000 sq. ft.	2100 W. Alton Ave.	140-061-91	AQ
11	1306 W. Santa Ana Blvd.	Medical/Office Building, <i>approved 2011</i>	6,000 sq. ft.	1306 W. Santa Ana Blvd.	007-183-08	AE, AQ, LU, NO, TR
12	Grand Avenue Widening Specifically included in SAFG No Build Description	Roadway Widening		First St. to Fourth St.	Multiple APNS	AQ
13	Broadway Reconstruction	Street Reconstruction		Civic Center Dr. to Santa Clara St.	Multiple APNS	AQ, CR
14	Bristol Street Widening Specifically included in SAFG No Build Description	Street Widening		Warner Ave. to Memory Ln.	Multiple APNS	AQ
15	First and Cabrillo Towers	Residential (Condo), <i>approved 2007</i>	374 units	1901 E. First St.	400-081-08	AQ
16	Related Co. Apartments	Residential (Apartments)	74 units	611 E. Minter St.	398-301-07	AQ, TR
A	First Street Widening Source: RTIP / RTP. Specifically included in SAFG No Build Description	Roadway widening from 4 to 6 Lanes		Susan St. to Fairview St.	Multiple APNS	AQ
B	Transit Zoning Code Specifically included in SAFG No Build Description	Land Use/Zoning Overlay, <i>approved 2010</i>		eastern third of SAFG Project Area	Multiple APNS	AE, AQ, CR, LU
APPLICATION UNDER REVIEW						
17	C & C Affordable Housing Project	Residential (Apartments)	36 Units	605 E. Washington Ave.	398-151-12	AQ, CR
18	Dayton Commercial Center	Commercial	7,275 sq. ft.	W. Edinger Ave.	408-273-11	AQ
19	Dr. Bui Medical Building	Medical Office	6,500 sq. ft.	202 N. Euclid Ave.	099-223-26	AQ
20	Francis Xavier	Residential (Affordable/Special Needs)	12 Units	801 E. Santa Ana Blvd.	398-303-04	AQ, CR, LU, TR
21	Related Co. Apartments	Residential (Apartments)	13 Units	714 E. Santa Ana Blvd.	398-312-18	AQ, TR
22	Related Co. Apartments	Residential (Apartments)	12 Units	801 E. Brown St.	398-312-09	AQ, TR
23	Related Co. Apartments	Residential (Apartments)	12 Units	806 E. Santa Ana Blvd.	398-313-02	AQ, TR
24	Related Co. Site A	Residential (Rowhouse)	6 Units	501-515 E. 5 th St.	398-332-06	AQ, TR
25	Related Co. Site B	Residential (Rowhouse)	9 Units	606-620 E. 5 th St.	398-228-02	AQ, TR
26	Related Co. Site C1 & C2	Residential (Rowhouse and duplex)	6 Units	601-607 E. 5 th St.	398-333-01	AQ, TR
27	Related Co. Site D	Residential (Rowhouse)	4 Units	615-621 E. 5 th St.	398-333-05	AQ, TR

TABLE 3.18-1: CUMULATIVE PROJECT LIST

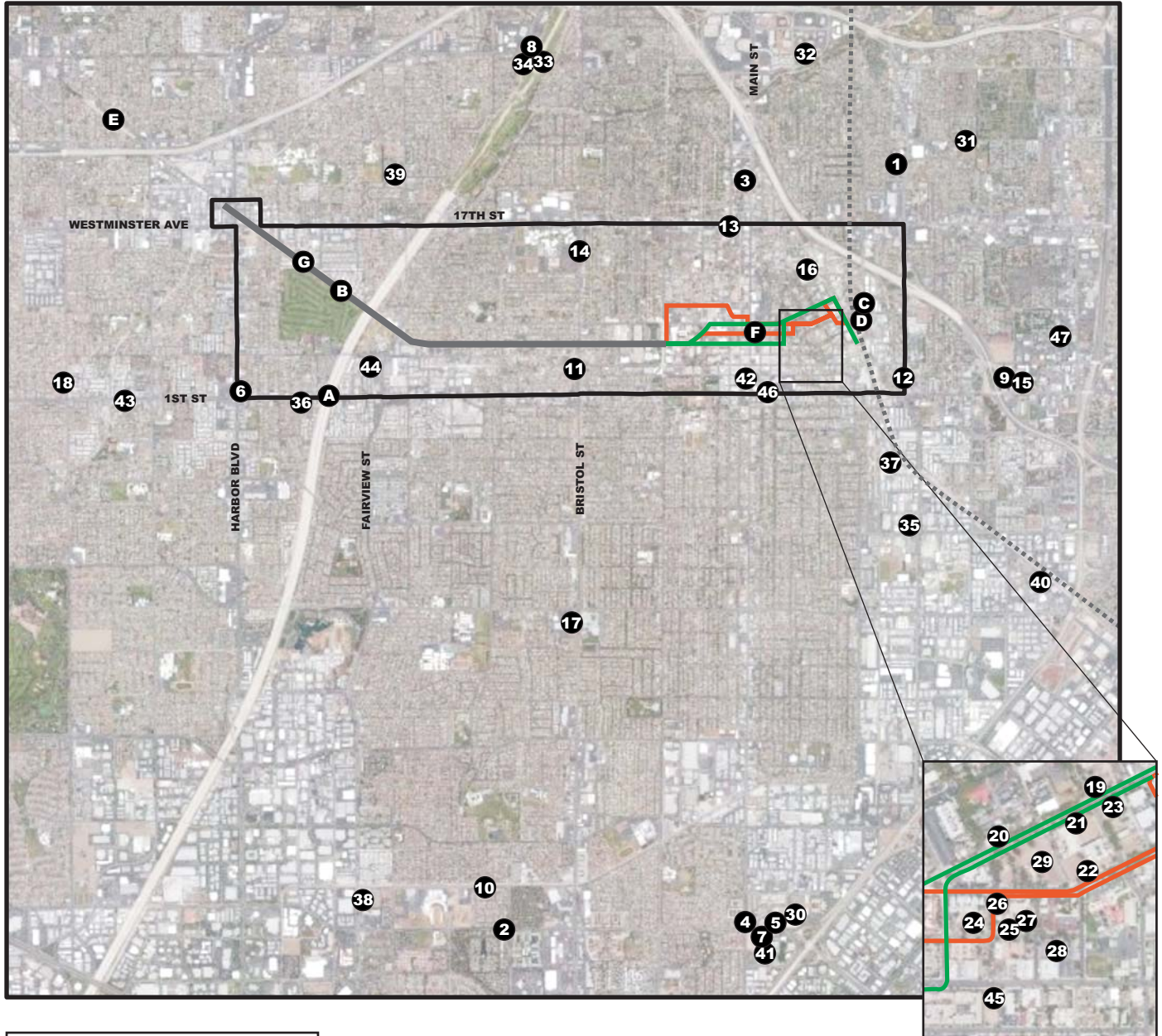
No.	Project	Description/Land Use	# Residential Units or Total Building Area	Location	Primary APN	Environmental Resource Area Potentially Impacted /a/
28	Related Co. Site E	Residential (Duplex)	2 Units	712 E. 5 th St.	398-337-03	AQ, TR
29	Santa Ana Blvd. Spec. Plan Area	Mixed-used	600 Units	Santa Ana Blvd.	398-311-14	AQ, CR, LU, NO, TR
30	The MET at South Coast	Residential (Condo) (five-and six-story over parking)	TBD	200 E. First American Wy.	411-074-03	AQ
31	TAVA Homes	Residential (Single Family)	24 Units	1584 E. Santa Clara Ave.	396-052-14	AQ
32	Town and Country Independent Living	Residential (Condo)	144 Units	555 E. Memory Ln.	041-213-04	AQ
33	Vista Del Rio	Residential (Apartments/Special needs)	41 Units	1600 W. Memory Ln.	101-055-27	AQ
34	1100 S. Grand Ave.	McDonald's with drive through	3,838 sq. ft.	1100 S. Grand Ave.	011-263-02	AQ
35	3312 W. First St.	Office (two-story)	29,000 sq. ft.	3312 W. First St.	144-341-07	AQ
36	630 S. Hathway St.	Industrial (two-story)	4,100 sq. ft.	630 S. Hathway	011-311-04	AQ
C	Santa Ana Blvd. Grade Separation PSR / conceptual engineering is in process. City of Santa Ana is lead. Not included in SAFG No Build	Reconstruct Santa Ana Blvd. at Metrolink railroad tracks		north of SARTC	Multiple APNS	AQ, TR
D	SARTC Expansion / Redevelopment Master Planning Stage - Santa Ana is lead, funded by OCTA Go Local. Not included in SAFG No Build	Intermodal Transportation Center / Land Use Development		SARTC and surrounding parcels including east of existing Metrolink tracks	Multiple APNS	AE, AQ, LU, NO, TR
E	PE Major Arterial RSTIS completed. OCTA to issue RFQ for PSR phase in 2011. OCTA is lead. Project is listed as part of the MPAH. Not included in SAFG No Build	New four-lane roadway in PE ROW / ramps to SR 22		PE ROW, from SR 22 to Raitt St.	Multiple APNS	AQ, TR
F	Class II bike lane on Civic Center Dr. City of Santa Ana is lead and planning concept for this bike lane has been identified. Not in SAFG No Build, but design for SAFG Streetcar Alternative 2 accounts	Early planning stages (per Citywide bicycle program)		TBD – on Civic Center Dr.	Multiple APNS	AQ, TR
G	Class I bicycle facility on PE ROW No work has been completed. Not in SAFG No Build list.	OCTA and County of Orange Bicycle Master Plan only.		Harbor Blvd. to Raitt	Multiple APNS	AQ, TR
UNDER CONSTRUCTION						
37	Alton Court	Residential (Single Family)	38 Units	3321 S. Fairview St.	414-171-01	AQ
38	Wintersburg Presbyterian Church	Classrooms, Gym, Outreach Center	24,348 sq. ft.	2000 N. Fairview St.	101-652-13	AQ
39	Audi Dealership	Commercial, addition to showroom	7,700 sq. ft.	1425 S. Auto Mall Dr.	402-101-37	AQ
40	Courtyard by Marriot Hotel	Hotel (155 rooms)	100,000 sq. ft.	8 McArthur Pl.	411-081-28	AQ
41	Downtown Artist Lofts III	Artist Live/Work Lofts	16 Units	SWC Main/3 rd St.	398-601-02	AE, AQ, CR, LU, NO, TR
42	Dr. Do Medical Office	Office (two-story)	6,000 sq. ft.	4718 W. First St.	108-101-45	AQ

TABLE 3.18-1: CUMULATIVE PROJECT LIST

No.	Project	Description/Land Use	# Residential Units or Total Building Area	Location	Primary APN	Environmental Resource Area Potentially Impacted /a/
43	Goodwill Industries	Office/Industrial	12,000 sq. ft.	410 N. Fairview St.	405-222-04	AQ, LU, NO, TR
44	Latino Health Access	Community Center	3,074 sq. ft.	602 E. 4 th St.	398-481-05	AQ, NO, TR
45	Santa Ana Express Car Wash	Drive-through car wash		202 E. 1 st St.	398-51-401	AQ
46	Olen Properties (Parkcenter)	Office (one and two-story)	29,170 sq. ft.	601 N. Park Center Dr.	400-042-04	AQ
47	One Broadway Plaza	Office (37-story)	518,000 sq. ft.	1109 N. Broadway	398-561-07	AQ

/a/Environmental Resource Area Key: AE = Aesthetics, AQ = Air Quality, CR = Cultural Resources, LU = Land Use, NO = Noise, TR = Traffic, Circulation and Parking Unit (u), Not Applicable (N/A) Projects A - G are reasonably foreseeable, but note that Projects C – F are not yet funded and committed. Projects A and B have been approved. Projects C - F are in various stages of early project development. Project Number: 12-14 retrieved from City of Santa Ana Capital Improvement Program FY 09-10 CIP Projects by Category (http://www.ci.santaana.ca.us/finance/budget/1011/10-11_proposed_annual_budget.pdf)

Source: City of Santa Ana.



LEGEND:

- Study Area
- PE ROW
- Metrolink/Amtrak Rail Line
- Streetcar Alternative 1
- Streetcar Alternative 2
- Potential Cumulative Project Location

0 0.6 1.2 MILES

Source: Retrieved from City of Santa Ana Capital Improvement Program FY 09-10 CIP Projects by Category (http://www.ci.santaana.ca.us/finance/budget/1011/10-11_proposed_annual_budget.pdf); updated by Terry A. Hayes Associates Inc., August 2012.

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3.18.2 Agriculture and Forestry

There are no agricultural, timberland, or forestry resources within the Study Area. The combined effect of Streetcar Alternative 1 or 2 with the No Build Alternative would not result in a cumulative impact. Therefore, the Streetcar Alternatives 1 and 2 would result in less-than-significant cumulative impacts related to agriculture and forestry.

3.18.3 Air Quality

In accordance with SCAQMD methodology, projects that result in a significant impact for either regional or localized air pollutant emissions would contribute toward a cumulative impact. Cumulative projects within the Study Area and the surrounding area would include redevelopment of existing uses, as well as development of new commercial and residential uses. As the Build Alternative would result in a regionally and localized significant impact during construction, it is anticipated that continued development (and associated construction activities) located predominately within the City of Santa Ana would also result in regional and localized air quality impacts. Therefore, the contribution of Streetcar Alternative 1 or 2 to this air quality construction impact would be cumulatively considerable.

For operational air quality emissions, projects that would not exceed the SCAQMD daily operational emissions significant thresholds would not contribute toward a cumulative impact. As discussed in Section 3.12 (Air Quality), Streetcar Alternatives 1 and 2 would not exceed the SCAQMD daily operational emissions significant thresholds. Therefore, the contribution of Streetcar Alternative 1 or 2 to cumulative air quality operational impacts would not be considerable.

3.18.4 Biological Resources

Due to the site-specific nature of biological impacts (i.e., tree removal), biological impacts are typically assessed on a site-specific basis, rather than a cumulative basis. The Study Area does not include threatened or endangered species or sensitive habitat. In addition, brush clearing and tree removal would be on a small scale as the Study Area is entirely urban. Nonetheless, cumulative growth could result in impacts to biological resources including locally protected trees or violation of the Migratory Bird Treaty Act. Related projects and other future development projects would be subject to the local, regional, State and federal regulations pertaining to biological resources, including the migratory bird act. With adherence to these regulations, the combined effect of Streetcar Alternative 1 or 2 with the No Build Alternative would not result in a cumulative impact. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant cumulative impacts related to biological resources.

3.18.5 Cultural Resources

Cultural resources include significant paleontological, archaeological and built environment resources. Cumulative impacts to these cultural resources are directly related to the presence and significance of these resources within the area of direct effect. No significant previously- or newly-recorded paleontological and prehistoric or historic archaeological sites have been identified within the Study Area. Given the lack of direct impacts to significant

paleontological or archaeological resources associated with the proposed project, no significant cumulative impacts are anticipated as a result of concurrent construction activities in the area.

The cultural resources assessment prepared for the proposed project has determined that the Streetcar Alternatives 1 and 2 would not result in an adverse effect to cultural resources. Based on record searches and historic research, there are a number of significant or potentially significant cultural resources located within the proposed project vicinity. These cultural resources could be impacted on the regional level by the development of all cumulative projects, in addition to the proposed project. Therefore, the proposed project could incrementally contribute to a cumulative effect.

However, the above-mentioned projects are subject to CEQA-level environmental review and include provisions to preserve historic structures and districts. Consequently, impacts to significant or potentially significant cultural resources can typically be mitigated through the avoidance of important cultural resources, the development and implementation of a data recovery plan, and/or following the Secretary of Interior Standards for the Treatment of Historic Properties. With adherence to these regulations, the combined effect of Streetcar Alternative 1 or 2 with the No Build Alternative would not result in a significant cumulative impact related to cultural resources.

3.18.6 Geology and Soils

Geotechnical hazards are site-specific, and there is little, if any, cumulative geological relationship between Streetcar Alternative 1 or 2 and the related projects. Nevertheless, cumulative development in the area would increase the overall population and number of structures, thus, increasing the risk of exposure to seismically-induced hazards. Related projects and other future development projects would be subject to the same local, regional, State, and federal regulations pertaining to geology and soils. With adherence to these regulations, the combined effect of Streetcar Alternative 1 or 2 with the No Build Alternative would not result in a cumulative impact. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant cumulative impacts related to geology and soils.

3.18.7 Greenhouse Gas Emissions

Generally, an individual project cannot generate enough GHG emissions to influence global climate change because it is the increased accumulation of GHGs which may result in global climate change. However, an individual project may contribute an incremental amount of GHG emissions that could combine with other emission sources to create concentrations of GHG that could influence climate change.

California is the fifteenth largest emitter of GHG on the planet, representing about two percent of the worldwide emissions. The transportation sector, largely the cars and trucks that move people and goods, is the largest contributor with approximately 37 percent of the State's total GHG emissions. Because of the high percentage of transportation-related GHG emissions, many GHG reduction plans (e.g., Orange County SCS) focus on reducing regional

dependence on single-passenger vehicles. Streetcar Alternatives 1 and 2 are designed to reduce VMT-related emissions by encouraging the use of public transit by providing accessibility to activity centers that provide employment and educational opportunities, goods, and services. Under Streetcar Alternative 2, a bicycle facility is proposed, furthering a reduction in transportation-related emissions. Streetcar Alternatives 1 and 2 would encourage a shift in mode of transportation travel from private passenger vehicle to commuter use of the mass transit system. As a result, contribution of Streetcar Alternative 1 or 2 to the combined GHG impact would not be considerable.

3.18.8 Hazards and Hazardous Materials

Potentially significant impacts of the related projects associated with hazards and hazardous materials, or the release, transport, and disposal of hazardous materials, would be assessed on a case-by-case basis. While impacts associated with hazards and hazardous materials are typically site-specific and do not cumulatively affect off-site areas, conditions such as contaminated groundwater can affect down-gradient properties. In addition, operation of the related projects can reasonably be expected to involve the limited use of potentially hazardous materials typical of those used in residential and commercial developments, including cleaning agents, paints, pesticides, and other materials used for landscaping. Related projects would be subject to local, State, and federal regulations pertaining to hazards and hazardous materials. It is expected that all potentially hazardous materials would be used, stored, and disposed of in accordance with manufacturers' specifications and handled in compliance with applicable standards and regulations. With adherence to these regulations, the combined effect of Streetcar Alternative 1 or 2 with the No Build Alternative would not result in a cumulative impact.

3.18.9 Hydrology and Water Quality

The geographic context for the cumulative impact analysis on water quality is the Santa Ana River watershed. Like Streetcar Alternatives 1 and 2, growth in the Santa Ana River watershed would be subject to National Pollutant Discharge Elimination System requirements regarding water quality. The Study Area is already densely developed and future land use changes or development are not likely to cause substantial changes in regional surface water quality. It is also anticipated that these related projects would also be subject to Standard Urban Stormwater Mitigation Plan requirements and implementation of measures to comply with total maximum daily loads. In addition, it is not anticipated that related projects would significantly impact flood control in the concrete-lined Santa Ana River. With adherence to these regulations, the combined effect of Streetcar Alternative 1 or 2 with the No Build Alternative would not result in a cumulative impact.

3.18.10 Land Use and Planning

Each of the related projects have been reviewed or are under review for consistency with applicable plans, policies and regulations of the City of Santa Ana's General Plan and Zoning Code. As discussed in Section 3.2 (Land Use and Zoning) above, Streetcar Alternatives 1 and 2 would be consistent with adopted land use plans and zoning codes. Selection of either Build Alternative would encourage new development around the stations, and allow access to Downtown and other high-intensity areas of employment, commercial development, and

recreational opportunities. New transit-oriented development would be facilitated near station areas with underutilized or vacant land uses. This would further encourage compatibility with surrounding land uses and zoning. The combined effect of Streetcar Alternative 1 or 2 with the No Build Alternative would not result in a cumulative impact

3.18.11 Mineral Resources

Each of the related projects would be reviewed on a case-by-case basis to ensure that there would not be significant impacts to mineral resources. Mineral Resource Zones or Oil Drilling/Surface Mining Areas have been identified within the Study Area or in the vicinity of the build alternatives. The combined effect of Streetcar Alternative 1 or 2 with the No Build Alternative would not result in a cumulative impact.

3.18.12 Noise

The noise and vibration analysis is based on the forecast of the future growth within the region and the Study Area. The environmental document for SCAG's 2012-2035 RTP/SCS concluded that cumulative noise impacts, including the proposed project, would be significant and unavoidable. However, as in Section 3.11 (Noise) above, Streetcar Alternatives 1 and 2, with implementation and enforcement of mitigation measures, would result in less-than-significant project-related noise impacts to sensitive locations along the alignment. As a result, contribution of Streetcar Alternative 1 or 2 to the combined noise impact with other development and transportation projects would not be considerable.

Although not a committed or funded project it is important to note the potential cumulative effect of the PE Arterial. The concept plan of the PE Arterial is on the Countywide Master Plan of Arterial Highways. The PE Arterial would be a new four-lane roadway in the PE ROW between SR 22 in the City of Garden Grove and Raitt Street in the City of Santa Ana. This future roadway, would thus share the PE right-of-way with Streetcar Alternative 1 or 2 between Westminster Avenue and Raitt Street. The City of Santa Ana is currently working with OCTA in order to initiate a feasibility study for the PE Arterial. According to a Central County Corridor Major Investment Study, the PE Arterial would attract approximately 28,000 vehicles per day, mostly from the west along SR 22. Those vehicles primarily headed into Downtown Santa Ana and points south, which reduced demand on regional freeways. While the regional circulation network would be relieved, it is reasonable to assume that traffic volumes would increase on surface streets if the PE Arterial is constructed. It is also reasonable to expect that noise levels would increase for sensitive receptors adjacent to the PE ROW as a result of this new roadway. Future environmental studies performed for the PE Arterial will identify impacted sensitive receptors and intersections, as well as required mitigation. In the event that the PE Arterial were constructed then there could likely be a cumulative noise impact associated the arterial and LRT rail projects. The noise impact analysis for the Streetcar Alternatives 1 and 2, however, indicates that no noise impacts would occur to adjacent residences in this segment. Thus the contribution of these alternatives to this future cumulative impact would not be considerable.

While impacts associated with vibration are typically site-specific and do not cumulatively affect off-site areas, transportation project could generate new sources of vibration.

According to the FTA Transit Noise and Vibration Impact Assessment (2006) guidance document, vibration levels generated by rubber-tired vehicles are rarely perceptible. There are no related projects that would generate transportation-related vibration other than that related to rubber-tired vehicles. Streetcar Alternative 1 or 2 would not combine with the No Build Alternative to result in a cumulative impact. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant cumulative impacts related to vibration.

3.18.13 Population and Housing

Although development of the proposed project supports urban growth, it would not remove an obstacle to population growth since the Study Area is heavily urbanized. The proposed project would provide improved mobility and access to the Study Area in accordance with adopted transportation and land use plans, these improvements would not result in substantial population growth. The Study Area experienced a population decline between 2000 and 2010, while vacancy rates increased.

3.18.14 Public Services

Potentially significant impacts of the related projects associated with increased demand for public services would be assessed on a case-by-case basis. Potential impacts to public services from the related projects would be mitigated to a level of less-than-significant through the local land use approval process. The proposed project would not create new trips but could change mode of access which could redistribute existing travel and change routes related to public services. The Cities of Santa Ana and Garden Grove are within an urban environment with an expansive street network and varied inventory of public services. The minor redistribution in travel would not over burden public services or result in substantial decreases in emergency response times. The police and fire stations are widely distributed throughout the Study Area and a street network that provides numerous alternate routes in the event of a crossing delay. Therefore, emergency response times would not be adversely affected. The combined effect of Streetcar Alternative 1 or 2 with the No Build Alternative would not result in a cumulative impact. Therefore, Streetcar Alternatives 1 and 2 would result in less-than-significant cumulative impacts related to public services.

3.18.15 Transportation and Traffic

The related projects are mainly land use development projects or are future funded and committed transportation projects that are encompassed in the 2035 traffic analysis that was performed for the No Build Alternative, TSM Alternative, Streetcar Alternative 1, and Streetcar Alternative 2. The results of the analysis, including potential traffic and circulation impacts, proposed mitigation measures, and impacts remaining after the proposed mitigation measures are implemented, are presented in Section 3.10 (Traffic and Parking) above, and captures the known cumulative impacts associated with the proposed project. Streetcar Alternatives 1 and 2 would not result in adverse traffic effects and the combined effect of Streetcar Alternative 1 or 2 with the No Build Alternative would not result in a cumulative impact to transportation and traffic effects.

3.18.16 Utilities and Service Systems

Potentially significant impacts of the related projects associated with utilities and service systems would be assessed on a case-by-case basis through permitting and will-serve letters, particularly for development projects. Operation of the Streetcar Alternatives 1 and 2 would require the use of various utilities, including electricity, natural gas, and communication systems. Electricity would be used to run the streetcar system. New TPSSs would distribute power along the alignment. The proposed project is included in regional and local land use and transportation planning documents, and utility companies have the capacity to meet the future demand for utility services. The quantities required would not be substantial and major modifications or new utility facilities would not need to be constructed to serve increased demand. The combined effect of Streetcar Alternative 1 or 2 with the No Build Alternative would not result in a cumulative impact to utilities and service systems.

Chapter 4.0 References, Organizations, and Persons Consulted

A number of technical reports and studies were utilized in the preparation of this Environmental Assessment. These reports are referenced throughout this document where appropriate. In addition, this chapter documents all persons and sources that contributed in the preparation of this Environmental Assessment.

4.1 References

American Community Survey, 2006-2010.

California Air Resource Board (CARB), 1997. *Transportation Project-Level Carbon Monoxide Protocol*, December 1997.

California Air Resource Board (CARB), 2005. *Air Quality and Land Use Handbook: A Community Health Perspective*, April 2005.

California Department of Transportation (Caltrans), 1998. *Technical Noise Supplement*, October 1998.

California Division of Mines and Geology, *Special Publication 42*, 2007.

California Geological Survey, 1998. *California Geological Survey. Seismic Hazards Zonation Program*, http://gmw.consrv.ca.gov/shmp/html/pdf_maps_so.html, accessed June 2011.

California Geological Survey, 2002. *California Fault Parameters*, <http://www.consrv.ca.gov/cgs/rghm/psha/Pages/Index.aspx>, accessed June 2011.

City of Garden Grove, 2012. *Business Statistics and Information*, retrieved from <http://www.ci.garden-grove.ca.us/?q=econdev/business/statistics>, accessed July 16, 2012.

City of Garden Grove, 2012. *2011-2012 Budget*. http://www.ci.garden-grove.ca.us/internet/pdf/finance/2011-2012_citybudget.pdf, accessed on July 12, 2012.

City of Garden Grove, Police Department, 2011. *Annual Report*, <http://www.ci.garden-grove.ca.us/pdf/police/2011annual-report.pdf>, accessed July 12, 2012.

City of Santa Ana Public Library.

City of Santa Ana, 1998. Planning Division. *City of Santa Ana General Plan, Circulation Element*. Adopted February 2, 1998, Reformatted January 2010.

City of Santa Ana, 2012, *Santa Ana and Garden Grove Fixed Guideway Project Traffic Impact Assessment Report*.

City of Santa Ana, 2012. *2012-2013 Budget*. http://www.santa-ana.org/finance/budget/2012-13/documents/2012-13_budget_summary.pdf, accessed on July 12, 2012.

City of Santa Ana, 2012. *Santa Ana and Garden Grove Fixed Guideway Project Traffic Impact Assessment Report*, February 2012.

City of Santa Ana, *Community Development Agency*, February 2010.

City of Santa Ana, Police Department, 2009. *2008-2009 Annual Report*, <http://www.ci.santa-ana.ca.us/pd/documents/2008AnnualReport.pdf>, accessed on July 12, 2012.

Cordoba Corporation, *Conceptual Design Plan Set*, October 2012.

County of Orange, *FY 2012-2013 Budget*, July 2012.

Cordoba Corporation, *Alternatives Analysis Report*, April 2014.

Federal Transit Administration (FTA), 2006. *Noise and Vibration Impact Assessment*, 2006.

Orange County Projections 2006 (OCP-2006).

Pratt, T.L., Shaw, J.H., Dolan, J.F., Christofferson, S.A., Williams, R.A., Odum, J.K., and A. Plesch, 2002. Shallow Seismic Imaging of Folds above the Puente Hills Blind- Thrust Fault, Los Angeles, California, *Geophysical Research Letters*, Vol. 29, No. 9. pp. 18-1-18-4.

Santa Ana Register of Historic Properties, 2011. *Database*, accessed June 2011.

Southern California Association of Governments (SCAG) 2010. *Final 2011 Federal Transportation Improvement Program (FTIP)*, September 2010.

Southern California Association of Governments (SCAG), 2011. *Local Profiles*, May 2011.

Southern California Association of Governments (SCAG), 2012. *2012-2035 Regional Transportation Plan/Sustainable Communities Strategy*, adopted April 2012.

State of California Employment Development Department, 2012. *Industry Employment and Unemployment Rates for Counties*, <http://www.labormarketinfo.edd.ca.gov/Content.asp?pageid=131>, accessed on July 23, 2012.

Transportation Research Board, 1980. *Transportation Research Board Circular 212 – Interim Materials on Highway Capacity*.

Transportation Research Board, 2000. *Highway Capacity Manual*.

U.S. Bureau of Labor Statistics, 2007. *2007 Employment Estimate for City of Santa Ana*.

U.S. Census Bureau, 2007. *Economic Census*.

U.S. Census Bureau, 2010. *Census. Summary File 1. Race, Hispanic or Latino*. <http://factfinder2.census.gov>, accessed on June 2011.

U.S. Census, 2010. *Fact Finder. 2010 National Redistricting Data*. <http://factfinder2.census.gov>, accessed on June 2011.

U.S. Census, 2010. Summary File 1, P1: *Total Population*. Generated using American Fact Finder. <http://factfinder2.census.gov/main.html>, accessed on July 2011.

Uniform Relocation Assistance and Real Property Acquisition Policies Act (Uniform Act) of 1970.

URS, 2011, updated by Terry A. Hayes Associates Inc., 2013. *Cultural Resource Evaluation Technical Report*, December 2013.

URS, 2011. *Map and Field Review*, July 2011.

URS, 2011, updated by Terry A. Hayes Associates Inc, 2012. *Noise and Vibration Technical Report*, February 2012.

URS, 2012. *Traffic, Circulation, and Parking Technical Report*, October 2012.

Chapter 5.0 List of Preparers

5.1 Public Agencies

Federal Transit Administration

Ray Sukys, *Director of Planning and Program Development, FTA Region 9*
Anthony Loui, *Community Planner, Office of Planning and Environment*
Hymie Luden, *Community Planner, FTA Region 9*
Ted Matley, *Community Planner, FTA Region 9*
Mary Nguyen, *Environmental Protection Specialist, FTA Region 9*

Orange County Transportation Authority

Jennifer Bergener, *Director, Rail Programs*
Kelly Hart, *Project Manager*
Laura Scheper, *Community Relations Specialist*

City of Santa Ana

David Cavazos, *City manager*
William Galvez, *Interim Executive Director, Public Works Agency*
Jason Gabriel, *Principal Civil Engineer, Project Manager*
Cindy Krebs, *Transit Planning Consultant*
Taig Higgins, *Principal Civil Engineer*
Souri Amirani, *Interim City Engineer*
George Alvarez, *City Engineer*
Dave Biondolillo, *Senior Transportation Planner*
Karen Haluza, *Planning Manager*
Zed Kekula, *Traffic Engineer*
Vinh Nguyen, *Senior Civil Engineer*

City of Garden Grove

Bill Murray, *Public Works Director*
Dai Vu, *Associate Engineer*
Chris Chung, *Assistant Planner*

5.2 Consultants

Cordoba Corporation

Catherine Higley, *VP of Transportation Planning*
Sandra Cuevas, *Senior Project Manager*
Robert Ramirez, *Senior Project Manager*
Narbeh Issagholian, *Project Planner*
Kathy Ortiz, *Office Manager*
Joe Villa, *CADD Manager*
Joe McTague, *Graphics Manager*
Jose Garcia, *Project Engineer*

Terry A. Hayes Associates Inc.

Terry Hayes, *CEO*
Sam Silverman, *Senior Associate and Project Manager*
Janet Murphy, *Senior Associate*
Madonna Marcelo, *Senior Planner*
Kevin Ferrier, *Senior Planner*
Mike Sullivan, *Planner*
Deborah Roberts, *Planner*
Ruby Arellano, *Assistant Planner*
Chris Minitti, *Assistant Planner*
Celestine Do, *Assistant Planner*
Annie Ho, *Assistant Planner*
Natasha Mapp, *Word Processor*

URS Corporation

Dave Levinsohn, *Vice President, Transportation Project Director*
John R. (Bob) Post, *Vice President, Conceptual Engineering Project Director*
Harley Martin, *Vice President, Environmental Project Director*
Jeff Rice, *Vice President, Environmental Project Director*
David Barrackman, *Geographic Information Systems*
Paul Burge, *Principal Engineer, National Practice Leader Acoustics and Noise Control*
Alana Callagy, *Technical Editor/Environmental Planner*
Julie Chan, *Environmental Planner*
Tin Cheung, *Senior Air Quality Scientist*
Pei-Ming Chou, *Environmental Planner*
Kevin Cunningham, *Environmental Planner*
Glenn DeBerg, *Environmental Planner*
Anthony Fiorentino, *Geographic Information Systems*
Maggie Fitzgerald, *Environmental Facilitator*
Cynthia Gabaldon, *Senior Project Engineer*
Kristin Hammond, *Word Processor*
Michal Higgins, *Geologist*
Greg Hoisington, *Ecologist, Permitting Specialist*
Jeremy Hollins, *Architectural Historian*
Lincoln Hulse, *Natural Resources Division Manager*
Omar Jaff, *Project Engineer*
Jordan Karp, *Senior Planner*
Jean Lafontaine, *Environmental Project Manager*
Joel Levanetz, *Architectural Historian*
Lucy Lin, *Senior Environmental Planner*
Joseph Long, *Principal Engineer*
Melanie Lytle, *Architectural Historian*
Sylvia McBride, *Technical Editor*
Chris Newcome, *Environmental & Urban Planner*
Thomas Petrosino, *Senior Transportation Planner*
Leslie Redford, *Environmental Scientist*
Julie Rush, *Senior Transportation Planner*
David Schug, *Geologist*
Susumu Shirayama, *Senior Noise Analyst*

Doug Smith, *Vice President, Traffic Task Leader*

Joe Stewart, *Principal Paleontologist*
Janet Tentler, *Senior Environmental Scientist*
Virginia Viado, *Environmental Deputy Project Manager, CEQA*
Stephanie Wilson-Goure, *Senior Transportation Planner*
Youji Yasui, *Project Environmental Planner*

Cambridge Systematics

David Kurth, *Vice President*
Ron West, *Senior Associate*
Smith Myung, *Senior Associate*
Ramesh Thammiraju, *Associate*

Consensus Inc.

Lilian DeLoza, *Vice President*
Jen Labrado, *Vice President*
Jill Shannon, *Director*
Abraham Mercado, *Assistant Account Manager*
Marianne Ng, *Assistant Account Manager*
George Gonzales, *Assistant Account Manager*

HNTB Corporation

Linda Bollinger, *Vice President*
Rick Phillips, *Director of Urban Design*
Pat Pence, *Senior Bridge Engineer*
Brian Elrod, *Principal Landscape Architect*

LTK Engineering Services

F.W. (Bill) Frandsen, *Vice President, SW Region*
Werner Uttinger, *Senior Vehicle Engineer*

David Evans and Associates, Inc.

Siegfried Fassman, *Regional Transit Director*
Bill Byrne, *Vice President*
Patricia McColl, P.E., *Vice President*
Bob Velasquez, *Vice President, Surveying*
Ed Schumm, *Senior Associate*
Elizabeth Mros-O'Hara, *Senior Planner*

Consultants to Orange County Transportation Authority

Mark Chang (CH2MHill), *Project Manager*
Tyler Bonstead (STV), *Project Manager*
Cody Christensen (STV), *Senior Planning Manager*
Ali H. Mir (STV), *Environmental Planning Manager*
Heather Jones, (STV), *Transportation Planner*